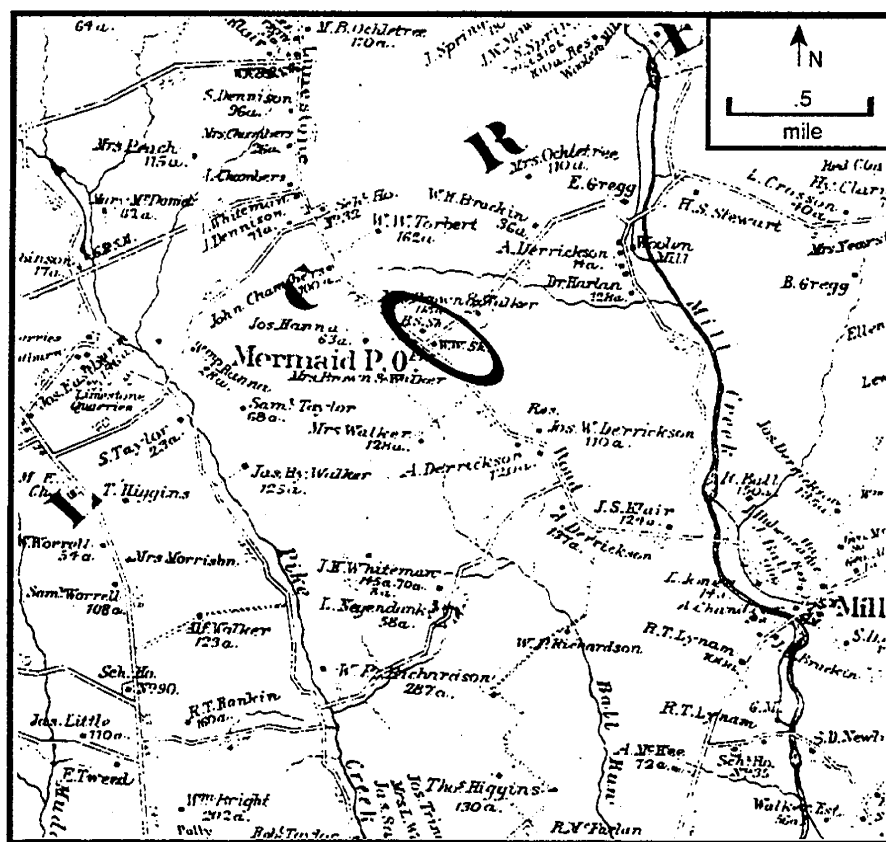


FIGURE 15



structure that occupied the southeast corner of the intersection. Twelve years earlier, he had removed the stone blacksmith shop and sheds.

The land remained in the ownership of Walker family descendants until the 1.89 acres containing the blacksmith shop were sold to Limestone Road Associates in 1982 (NCCD K-118:209). The wheelwright shop property was sold out of the family in 1988 (Table 3).

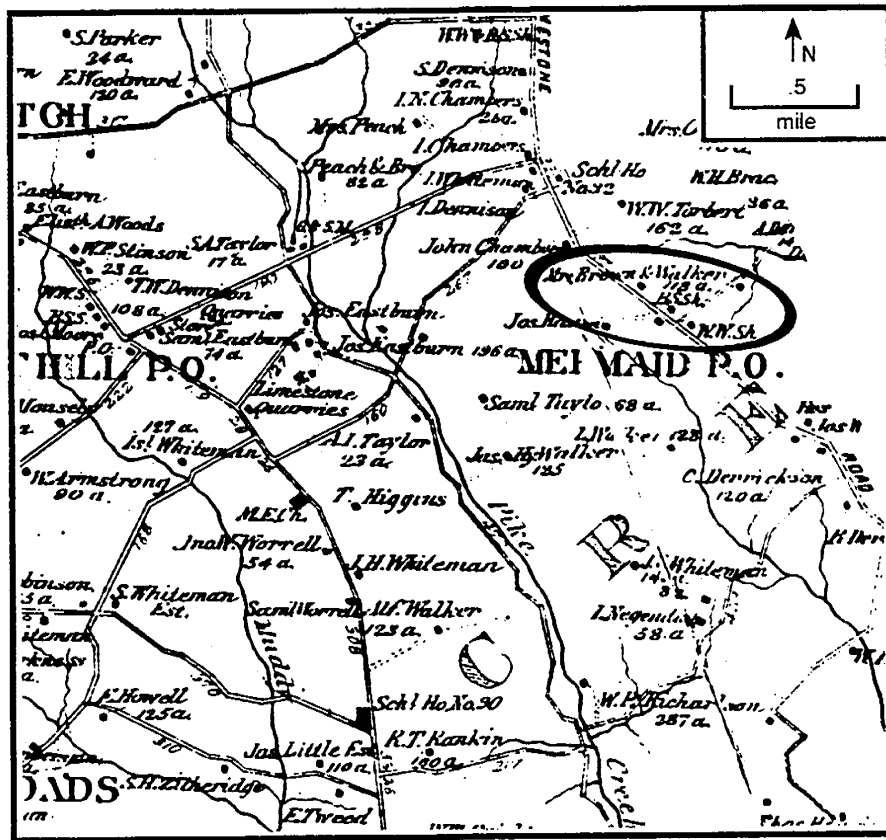
MERMAID BLACKSMITH SHOP AND STABLE (7NC-D-106B)

RESULTS OF FIELD INVESTIGATIONS

The proposed Right-of-Way at the intersection of Limestone Road and Old Mermaid-Stoney Batter Road that contained the blacksmith shop site was approximately 70' in width east of the existing road edge. DelDOT road improvements in 1964 disturbed the first 30' of the proposed Right-of-Way

FIGURE 16

Detail of Limestone Road, Mill Creek Hundred, from G.W. Baists' "Atlas of New Castle County" (1893)



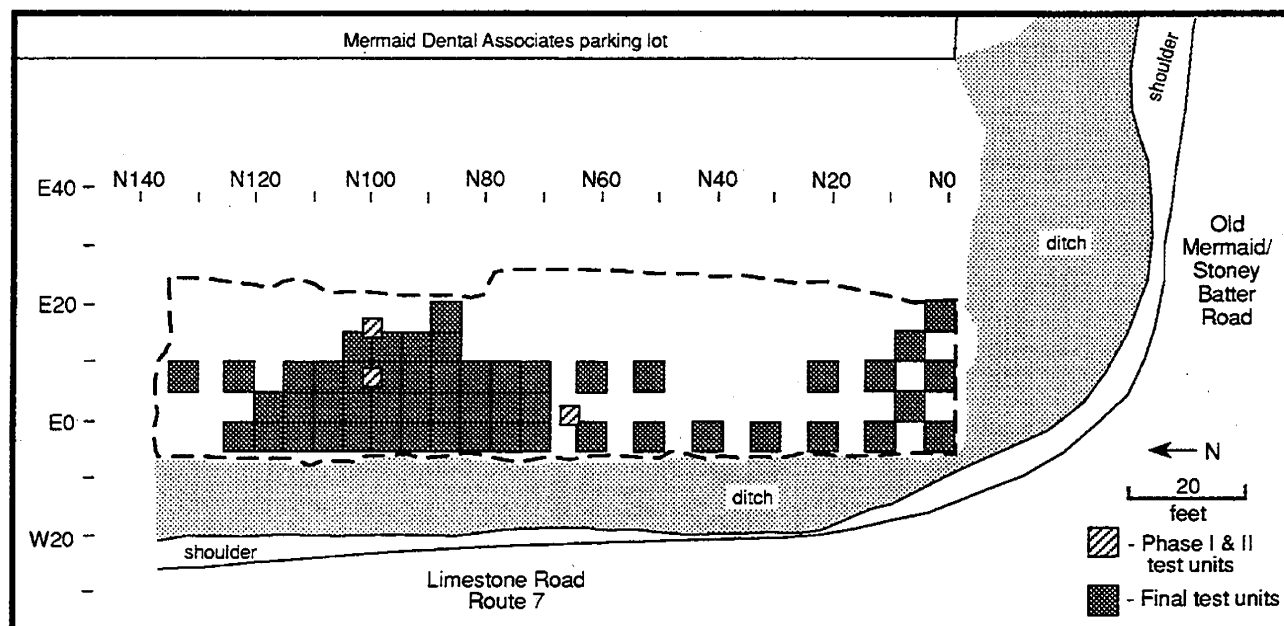
east of the road pavement edge. These road improvements were assumed prior to excavation to have destroyed or disturbed a major portion of the site, including most of the blacksmith shop.

The Phase I and II investigations conducted previously at the site (Catts et al. 1986:77-78, 157-158) were unable to locate any features associated with the shop, although a buried Ap soil horizon was encountered approximately .8' below ground surface, beneath a level of landscape fill. As originally conceived, field excavation methods were designed to recover archaeological data from the area that was assumed to be behind the blacksmith shop, as well as to try and uncover any features associated with the shop. No architectural remains associated with the blacksmith shop were expected to be found during the course of the present Phase II investigations.

To expedite the field excavation, the landscaping fill was mechanically stripped by DelDOT. Archaeologists removed the remaining fill down to the top of the buried plow zone. A temporary datum

FIGURE 17

Plan of the Test Unit Excavations at Mermaid Blacksmith Shop and Stable Site



was established at the southwest corner of the stripped area. From this datum, a 5' x 5' grid was placed over the site. The 5' x 5' grid units were used as the test unit blocks excavated throughout the course of the field excavation. Provenience for each test unit was located at the southwest corner of each unit. The buried plow zone was excavated as one level. Excavated soils were screened through 1/4-inch dry screen and all artifacts recovered were bagged with the proper provenience information indicated on each bag. Plow zone excavation began in the southwest portion of the site, but soon testing began to focus on the northern half of the stripped area where plow zone soils were notably darker and appeared as a large black stain. Test units were excavated in a contiguous fashion within the buried Ap horizon (black plow zone) soils due to high artifact counts and the presence of features. A total of 52 5' x 5' test units were excavated at the site. Soil samples were collected from the buried plow zone level of 38 of these units (Figure 17). It was originally believed that the blacksmith shop was located close to the intersection. This assumption was changed during the course of the investigations when it was discovered that the remains of the rear wall of the shop and stable buildings were still extant beneath the buried plow zone soils, and extended parallel to Limestone Road for nearly 120 feet.

All of the features with the exception of Feature 11 (the stable/shop wall) were cross-sectioned. Portions of Feature 11 were excavated in 5' sections. The features were mapped in profile and plan views and photographed through the course of the feature excavations. Soil samples were collected from select features. Soils excavated from the feature halves were screened through 1/4-inch dry screen and the artifacts were bagged and provenienced accordingly. A total of 11 shovel test pits were excavated to further define the extent of Feature 11. Based on the results of these shovel test pits, seven additional 5' x 5' test units were excavated at equal intervals from NOW5 to N60W5 to further expose Feature 11. Test Unit N120W5 was excavated into the subsoil to try and better expose the corner of the stone foundation (Feature 11). As mentioned above, a second plow zone was identified. Three 5' x 5' test units (N90E5, N95E0, N100E5) were excavated into this second plow zone to sterile subsoil. Overall site maps were constructed and photographs were taken through the course of the field excavations.

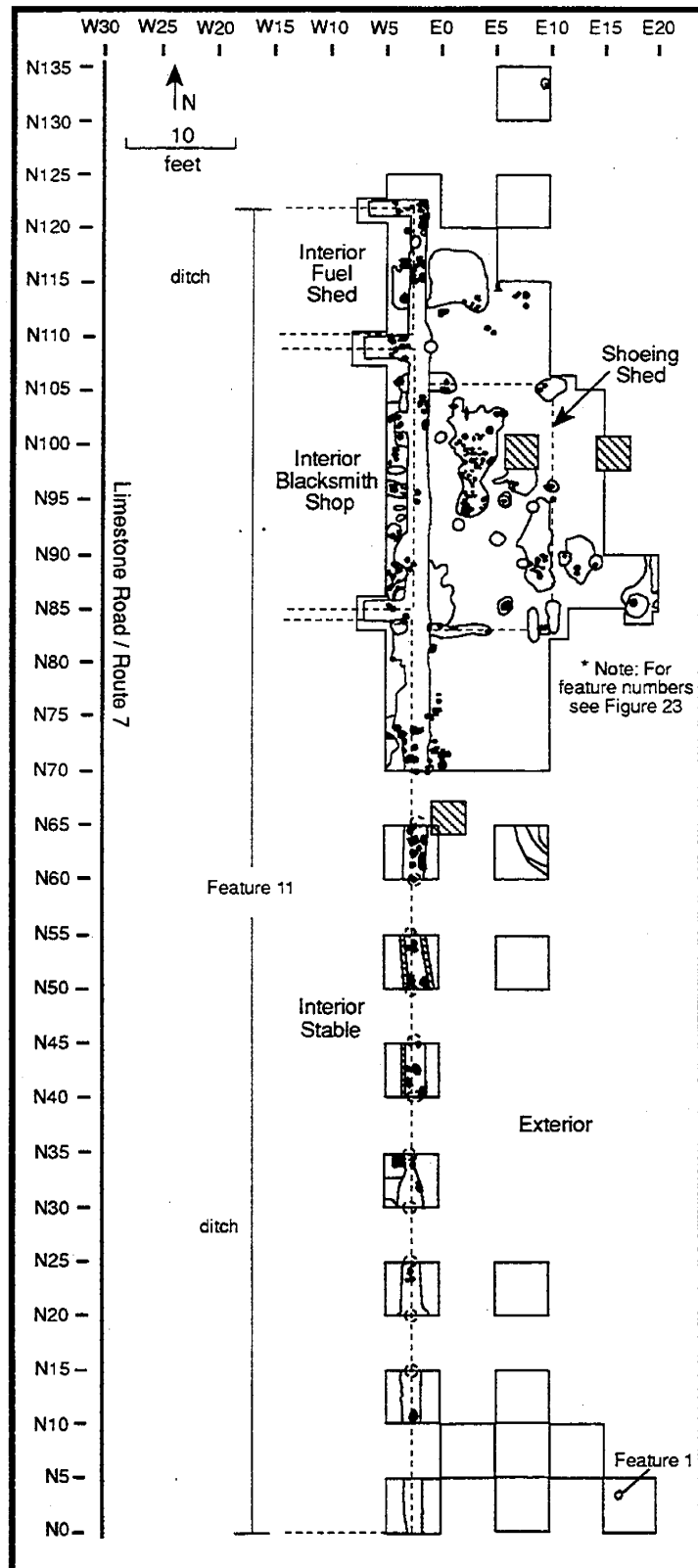
The investigations at the Mermaid Blacksmith Shop located a total of 46 features (Figure 18). The features at the site can be divided into several groupings: those associated with the stable, those located inside of the shop, those located in the northern addition, the features located outside of the shop and possibly in a shoeing shed, and those in the rear yard area. Each of these groups will be discussed separately below.

Stable Features

There are five features associated with the stable end of the site: Features 1, 11, 25, 27, and 32 (Table 6). Feature 11 consisted of an unconsolidated rubble stone wall with remnants of mortar extending from N0E0 approximately 85 feet northward to a wall section running perpendicular and west at N85W0. The wall appeared to have been robbed. This portion of Feature 11 was a long linear feature about 1.5 to 2.0 feet in width and approximately 1.5 feet in depth, containing large mortared field stones (Plate 4). Figure 19 illustrates the north wall profile of N30W5. In two test units, N40E0 and N50E0, evidence of shallow builders trenches were observed. Several iron reinforcing rods were observed emplaced in the wall at N0W5, N20W5 and N30W5. A possible interior partition wall consisting of decaying mortar and rubble was observed in Test Unit N30E0 extending westwards

FIGURE 18

Plan of Test Units and Features at Mermaid Blacksmith Shop and Stable Site



towards Limestone Road. As with all of the features located west of the W5 line, this wall was transected and disturbed by the widening and ditching along Limestone Road.

Features 25, 27 and 32 were located on the interior side (or west side) of Feature 11. Feature 25 (Figure 20) was a roughly rectangular (1.5' x 1.2') post hole with a rectangular post mold (.3' x .6') located in the center of the hole. The post was 1.1' deep and was supported by large stones and rocks. Neither hole nor mold contained artifacts. Feature 27 was an 8.7' long, shallow soil stain located in the northeastern corner of the stable (N70W5 and N75W5). Feature 32 was located in N70W5 and was similar in depth to Feature 27. These two features contained small amounts of glass, brick, redware, nails, and bone. Feature 32 contained a jasper flake.

Feature 1 was located in Test Unit N0E15, east of and behind the rear stone wall of the stable. It was a small .5' x .5' post hole that was .8' in depth. The feature was probably part of a rear fenceline delineating the stable yard from

TABLE 6
Summary of Stable Features

Feature	Unit	Dimensions	Description
1	N0 E15	.5' long .5' wide .8' deep	Post hole that was probably part of a rear fenceline delineating the stable yard from the remaining "Mermaid" property.
11	N0 W5 N125 W0	122' long 1' wide	Dark linear stain of large stones and mortar; the remains of the rear wall of the blacksmith shop and the stable; interior walls and additions are present.
25	N80 W5	1.5' long 1.2' wide 1.1' deep	Medium brown silt loam roughly circular stain. Both a post hole and mold. Mold was .3' x .6', held in place by stones. Contained no artifacts. Located to the south of and outside of the shop; in the stable area.
27	N75 W5	8.7' long .4' deep	Medium orange silty loam with mortar and charcoal. Located to the south of and outside of the shop, and inside the stable. Artifacts included redware, window glass, metal, and bricks.
32	N70 W5	3.4' long 1.3' wide .3' deep	Truncated by edge of excavation unit. Dark silty loam soil stain, roughly circular. Very shallow, located within the stable area, outside of the shop. Contained nails, bone fragments, glass, and a jasper flake.

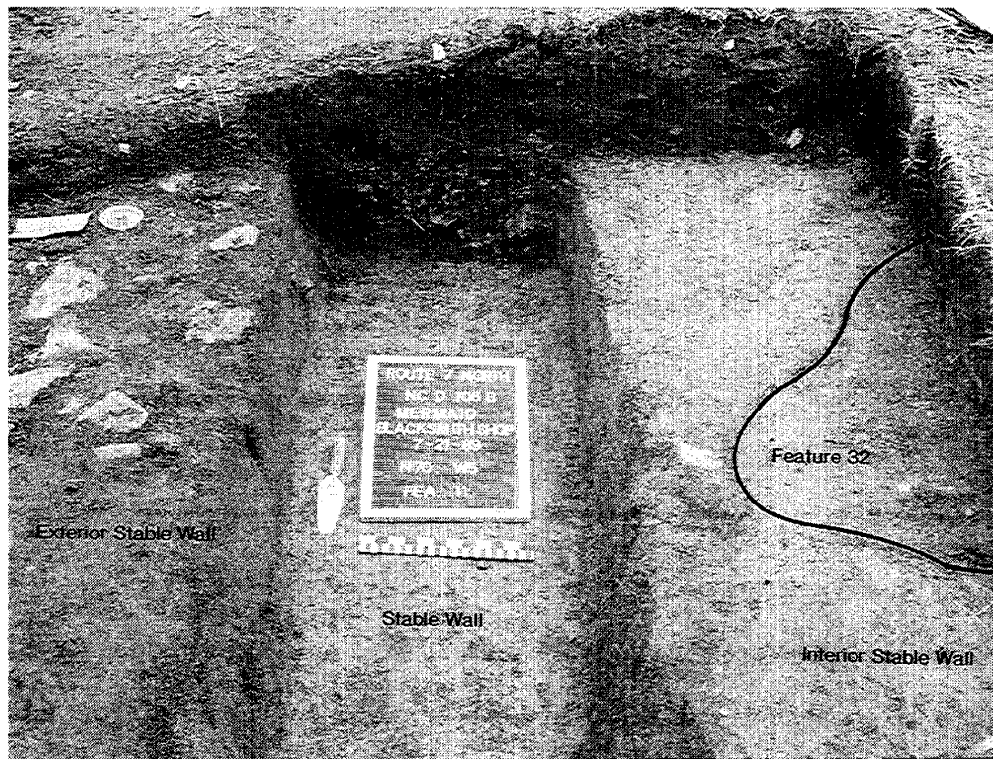
the rest of the Mermaid Property.

The mortar partition wall seen in Test Unit N30W5 would have divided the stable interior into at least two rooms or spaces, one about fifty-five feet in length, and the other about thirty feet in length, located between the Stoney-Batter Road and the interior wall. Based on the reminiscences of the owner of the Mermaid Tavern and on the scanty archaeological evidence, it is likely that the stable was open along the Limestone Road (or west) side, and was a long, one-story stone structure with a dirt floor suitable for sheltering horses (as many as twenty-four) and wagons (Evans 1989). The presence of the reinforcing iron rods in the southern 30 feet of the stable, below the partition wall evident in Test Unit N30W5, suggests that this end of the stable may have been added or rebuilt at some time.

Blacksmith Shop Features

At N85W5 the stable wall portion of Feature 11 butted directly into the blacksmith shop portion of Feature 11 (Plate 5). The blacksmith shop section of Feature 11 was only .5' deep, compared to the 1.0' deep stable section to the south, indicating a separate period of construction. The robbed mortared stone wall of the shop was approximately 2' wide. The entire rear wall, 26' long, was uncovered, and small parts of the south and north walls were found where they had not been disturbed and destroyed by the widening and ditching of Limestone Road (Plate 6). Table 7 contains a summary of the features

PLATE 4
Feature 11, N70W5, After Excavation



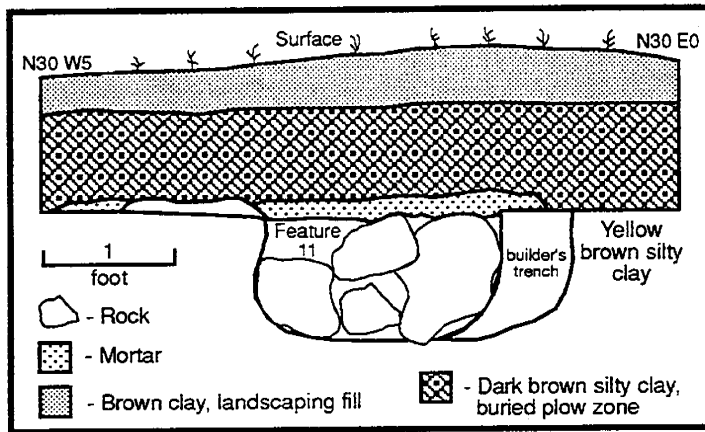
associated with the blacksmith shop.

The interior portion of the shop measured approximately 22' from north to south. Twelve features (numbers 12, 13, 14, 18, 19, 20, 21, 23, 24, 29, 30, and 39) were located inside of the blacksmith shop, within the few feet of remaining undisturbed soils. Only three of these features were deep post-like features; numbers 21, 23, and 29. Feature 21, located in the immediate southeast corner of the shop, consisted of a dark brown silt loam and measured 1.2' in diameter and was 0.8' deep (Figure 21). The post mold for this feature measured .2' x .4'. Like other posts at this site, Feature 21 was supported by several stones that were jammed against the post. The feature contained nails, brick fragments, mortar, and a piece of white salt-glazed "scratch blue" stoneware.

Feature 29 was located close to the extreme northeast corner of the shop. At the surface of the subsoil the feature seemed to measure 2.1' across. It was found however, that the actual post mold was

FIGURE 19

Profile of North Wall of N30W5



approximately .5' square, and extended to a depth of 1.5' (Figure 22). The soils were a medium brown silty clay, and the feature contained nails, slag, redware, and brick fragments.

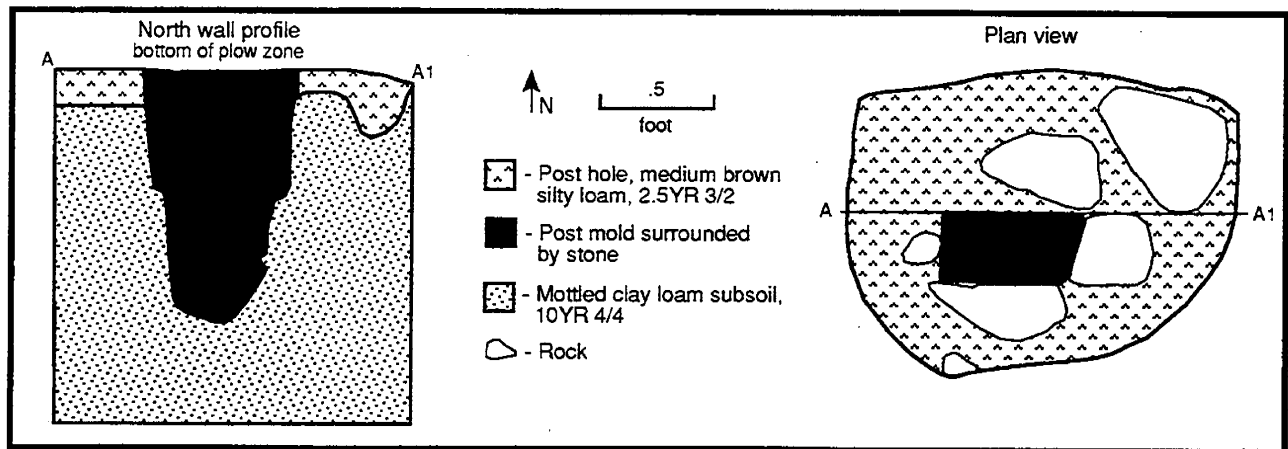
The final deep feature inside of the shop was Feature 23. Located immediately south of and adjacent to Feature 29, Feature 23 was a 3.2' long and 1.0' wide dark brown silt loam stain extending west

towards Limestone Road. Along its southern edge the feature butted up against a small partition wall running west from the rear wall of the shop. Feature 23 was 1.2' deep and contained mortar, charcoal, and coal fragments. Possibly Feature 23 served as a structural support, or as an interior wooden partition. Features 21 and 29 were more than likely interior supports of some kind, possibly for shelving along the rear wall of the shop. Due to the damage caused to the archaeological evidence by the road construction in 1964, all of the interpretations for the interior shop features are tentative.

The remainder of the features inside of the shop were very shallow soil-filled depressions that contained coal, ash, charcoal, and clinker fragments, as well as ceramic and glass fragments (Features 13, 19, 20, 24, 30, and 39). Feature 14 consisted of several large stones, bricks and mortar in a dark brown silt loam matrix, and Feature 12 was probably the depression left by a large stone associated with Feature 14. These two features together may represent the remains of a stone pier or support. Feature 18 was a shallow, basin-shaped dark brown silt loam soil stain that contained a large amount of charcoal, ash, burnt metal and fire-cracked rocks. The contents of the feature, which is located in N90W5, suggest that the hearth or forge was located nearby, probably in the truncated and no longer extant section of the shop.

Two westward extensions of the rear wall of the shop (Feature 11) were located at approximately N89W5 and N102W5. The extension at N89W5 was excavated as Feature 11A. Located about 10.5' apart, these two wall sections could represent door jams for a set of doors that

FIGURE 20
Plan View and Profile of Feature 25



opened through the rear of the blacksmith shop into the shoeing shed (see below).

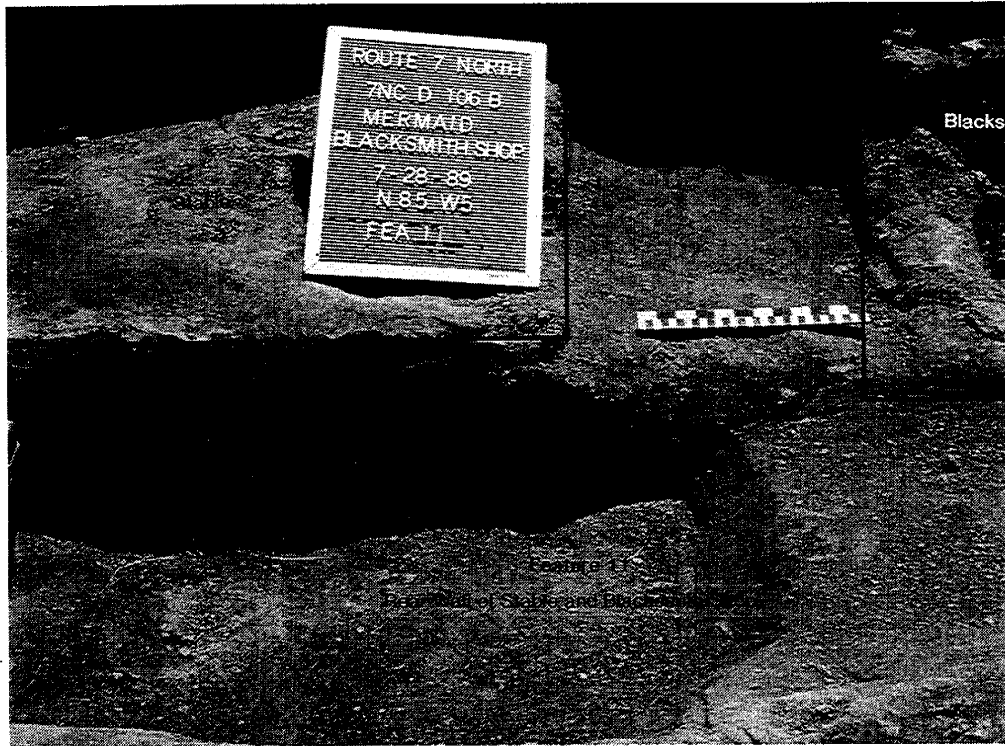
Coal Bunker or Fuel Shed Features

An addition was uncovered butting against the north wall of the blacksmith shop, beginning at N110W5 and extending to N122W5 (Plate 7). Measuring approximately 12' to the northeast corner of Feature 11, the wall made a right-angle turn towards Limestone Road, and was truncated by the road and ditch (Plate 8). Based on the large amount of coal recovered from this area during the plow zone testing, this addition is interpreted to have been a coal bunker or shed attached to the blacksmith shop. The depth of Feature 11 along this addition (approximately 1.0' deep) was very similar to the depth of the stable wall that adjoined the south wall of the shop, suggesting that these two buildings were constructed at about the same time, and perhaps by the same stone masons (Plate 9). The stones used in the construction of the addition were more angular than those found in the shop section, and the northeast corner of the addition showed evidence of reinforcing with cobbles. Table 8 summarizes the features associated with the fuel shed.

Feature 31 was the only feature located within the addition. After stripping Feature 31 appeared as a 4.2' long and 1.8' wide, roughly rectangular, dark brown silty loam stain butting directly with the rear wall of the addition. The depth of the feature varied somewhat from .2' to .8'. During excavation, a 1.4' deep post hole and mold were discovered in the southern portion of the feature in direct association with the rear wall. Feature 31 contained numerous stones and brick fragments, a large

PLATE 5

View Looking West at the Joining of the Blacksmith Shop and Stable, N85W5



amount of coal and charcoal, and a complete glass bottle base dating from the period 1790-1825 (Plate 10). Parts of this bottle were also recovered from Feature 4.

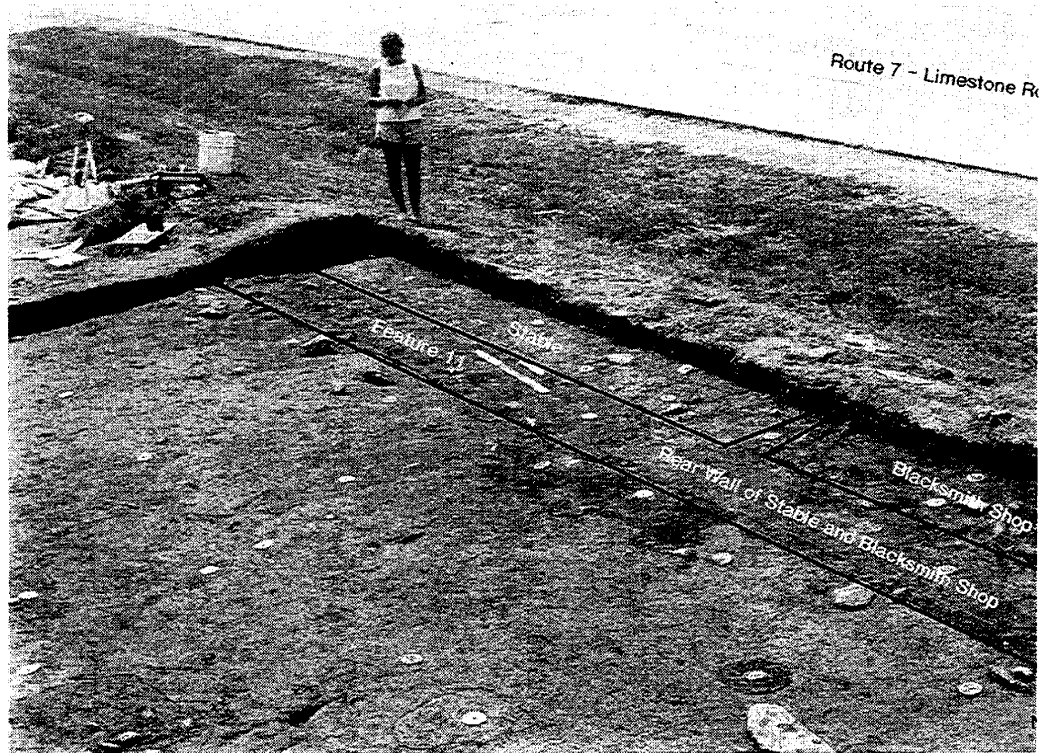
Two post hole features were located within the rear wall of the addition, beneath Feature 11 (Plate 11). Features 44 and 45 were found in Test Unit N115W5 and possibly predated the construction of the coal shed addition (Feature 11). Feature 44 was a square post 1.8' deep, and Feature 45 was a smaller round post of approximately the same depth. Feature 30, located in the shop portion of Feature 11 in N105W110, was a post that was also bisected by Feature 11, suggesting that it too, like Features 44 and 45, may have predated the construction of the stone foundation.

Horseshoeing Shed Features

The best archaeological evidence at the Mermaid Blacksmith Shop and Stable site was associated with a structure that is tentatively interpreted as a horseshoeing shed (Plate 12). A total of

PLATE 6

Feature 11, Rear Wall of Blacksmith Shop, Prior to Excavation



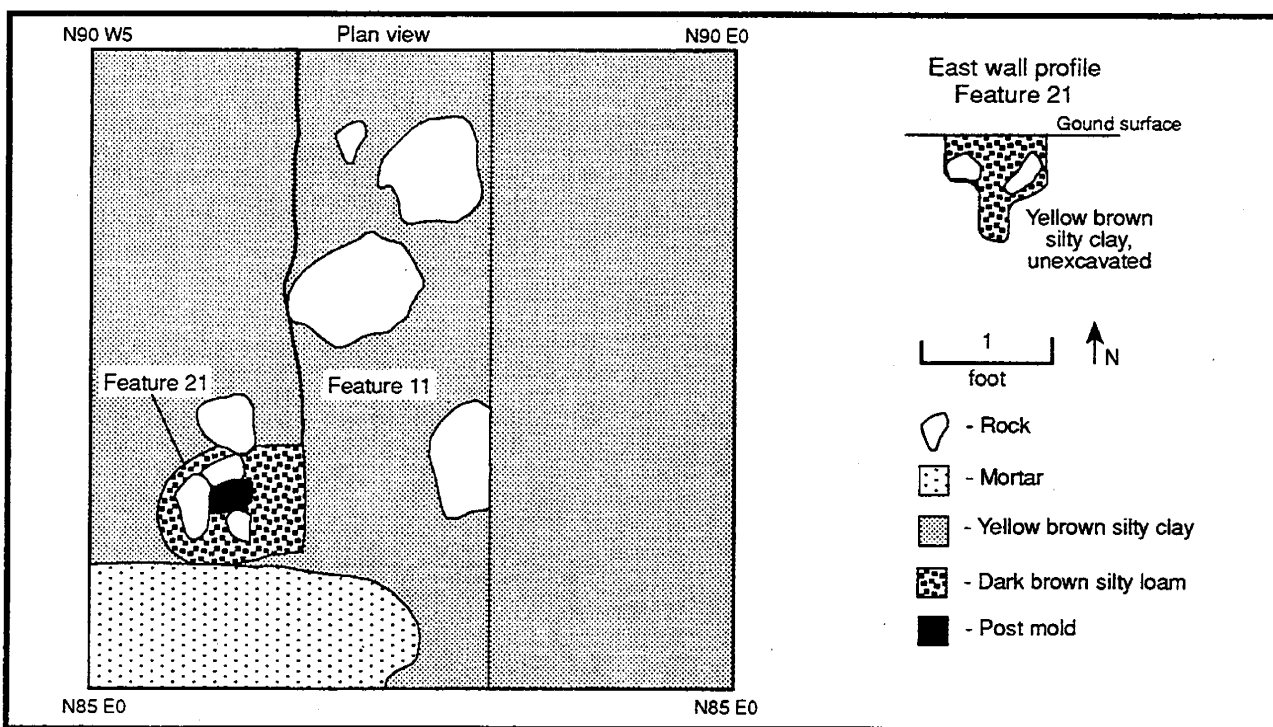
twenty features are part of this structure including corner supports, shoeing locations, post holes and molds, a possible anvil location for cold forging, and debris piles (Figure 23). Table 9 contains a summary of the features associated with the shoeing shed.

The exterior walls of the shed are represented by Features 36, 34, 43, and 42 along the south wall; by Features 2B and 38 along the east wall; Feature 5 at the northeast corner; and Feature 28 at the northwest corner. Together these features form a shed approximately 22' (north-south) by 12' (east west), butting directly against the east (rear) wall of the blacksmith shop. The corner features associated with the shed are all very shallow depressions. Features 36 and 28, located closest to the rear wall of the shop, appear to be the remains of shallow ground-laid wooden sills (Plate 13). Feature 5 at the northeast corner of the shop was also very shallow (.4' deep), and was a circle roughly 2.0' in diameter (Plate 14). Like the ground-laid sills, Feature 5 may represent the remains of a wooden block or pier

TABLE 7
Summary of Blacksmith Shop Features

Feature	Unit	Dimensions	Description
11	NO W5 - N125 W0	122' long 1' wide	Dark linear stain of large stones and mortar; the remains of the rear wall of the blacksmith shop and the stable; interior walls and additions are present.
12	N95 W5	0.5' square 0.25' deep	Small, squarish silty loam stain next to Features 11 and 14. Located inside of shop walls. Could be remnant of post hole.
13	N95 W5	1.5' long 0.15' deep	Elongated oval dark carbon soil stain; very shallow and basin-shaped. No artifacts recovered.
14	N95 W5	1.5' wide 2.0' long 0.6' deep	Dark brown silty loam rectangular stain extending west from Feature 11; truncated by road construction; fairly shallow; contained bricks and several large rocks with mortar and carbon flecks. Remains of interior partition or wall?
18	N90 W5	1.5' diameter 0.4' deep	Circular, basin-shaped dark brown soil with ash, charcoal, burned metal, and fire-cracked rocks. Located inside of Feature 11, the wall of the shop.
19	N90 W5	0.6' diameter 0.3' deep	Dark brown silt loam stain with metal, brick, slag, and redware fragments. Interior of shop wall.
20	N90 W5	4.0' long 0.4' deep	Dark silt loam stain with mortar, charcoal, and ash. Contained window and bottle glass, redware, iron parts, horseshoe fragments, and white salt-glazed stoneware. Located in the interior of the shop.
21	N85 W5	1.2' diameter 0.8' deep	Dark brown silt loam post hole and mold. Chinking stones jammed around the .2' x .4' mold. Contained brick, nails, mortar, and white salt-glazed stoneware. Located in the interior of the shop, at the south-east corner.
23	N100 W5	3.2' long 1.0' wide 1.2' deep	Dark brown silt loam mottled with mortar, coal and charcoal. Truncated by 1960's road construction and site demolition. Contained slag, brick, mortar and glass. Located inside of shop wall. Could be post hole or support.
24	N100 W5	1.0' long 1.4' wide 0.15' deep	Dark brown silty loam squarish stain, very shallow, containing iron, and mortar fragments. Located inside of shop wall.
29	N105 W5	2.1' long 1.5' deep	Post hole and post mold. Medium brown silty clay, with decaying wood. Artifacts included slag, nails, redware, and brick. Located inside of back wall of the shop.
30	N105 W5	1.2' diameter 0.15' deep	Circular, shallow brown soil stain. Contained slag, metal, and a quartz flake. Covered partially by Feature 11, the back wall of the shop.
39	N90 W5	1.3' diameter 0.3' deep	Oval-shaped shallow dark silty loam stain with charcoal and mortar. Contained brick, metal, slag and glass fragments. Located inside of Feature 11, the back wall of the shop. Probably associated with the wall.

FIGURE 21
Plan View and Profile of Feature 21

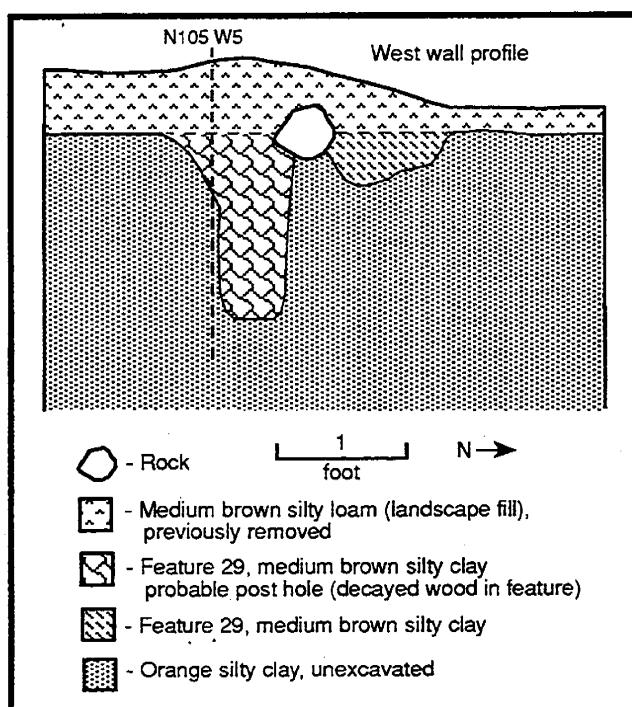


support for the shoeing shed. The three southeast corner features (34, 43, and 42) represent both ground-laid sill and post construction (Plate 15). Features 42 and 34 are the remains of sill supports, while Feature 43 was a true post hole and mold, 1.0' square, extending about .8' deep and containing nails and brick fragments.

Inside of the shed several post holes and molds were excavated (Features 2A, 3, 16, 33, and 37). All of these features were between 1.1' and 1.6' deep, and all contained support stones jammed into the post hole in direct association with the post mold (Plates 16 and 17). Feature 2B, located along the eastern edge of Feature 2, was also a post hole and mold, although it was only .8' in depth. Both Feature 2A and 2B intruded upon Feature 2.

Two large amorphous features (numbers 2 and 4) were located inside of the shoeing shed. Feature 2 was roughly oval in shape, measuring 9' x 3' (Plate 18). The feature contained large amounts of charcoal, over 14,000 grams of brick, 970 grams of slag, and cobbles, along with smaller numbers of metal fragments, horse shoe parts, cut and wrought nails, shoeing nails, rivets, iron sheeting, and ceramic

FIGURE 22
Profile of Feature 29



and glass fragments. The depth of the feature was irregular, ranging from .3' to .8' below the subsurface.

Feature 4 (Plate 19) was remarkably similar to Feature 2; measuring 10' x 5', it was shaped roughly like a triangle with the northern end of the feature as the base. The bottom of the feature was irregular and pocketed, averaging only .4' in depth, except in the northwestern and northeastern corners, where the feature was slightly deeper. Over 21,400 grams of iron slag, 2,160 grams of mortar, and 108 grams of brick were recovered from the feature, along

with some window and bottle glass, ceramic fragments, and shoeing nails, cut and wrought nails, tool fragments, and metal debris.

Features 2 and 4 are interpreted as shoeing pits located inside of the shed. Feature 2 may have been located inside of a stall, formed by the posts (Features 33 and 37). The posts associated with these shoeing pits would have been used to secure the horses' heads, probably with chain links, so that the smith could remove old or worn shoes and attach new ones. The pits were created by the digging and stamping of the horses, and modern equestrians indicate that such pits are often filled with cobbles and other debris.

Feature 22, located in the extreme southwestern corner of the shoeing shed, butted up against the rear foundation wall of the shop (Feature 11) and the southern wall of the shed (Feature 36) (Plate 20). The feature was about 6.0' long and 1.5' wide, but was very shallow, measuring only .2' below subsurface. Feature 22 was an amorphous, ill-defined dark silt loam stain containing burnt wood and charcoal, as well as window and bottle glass, nails, metal parts, redware and creamware fragments, and one jasper and one quartz flake. Feature 22 is interpreted as a trash or debris pile located within the shoeing shed.

PLATE 7

Feature 11, N105W5, Corner of Blacksmith Shop and Fuel Shed, After Excavation



Feature 15 was located in Test Unit N95E5 and was a roughly circular dark brown silty loam stain measuring about 2.4' in diameter (Figure 24). The northern edge of the feature had been barely clipped by the excavation of Test Unit 3 during the Phase I testing of the site (Catts et al. 1986:158, Plate 21). Feature 15 was 1.7' deep and was packed with large stones and cobbles, mortar, over 300 grams of brick and 575 grams of iron slag, redware and pearlware fragments, cut and wrought nails, iron sheeting, bar stock, and metal debris (Plate 22).

The densely-packed nature of the stones within Feature 15 suggest that the stones supported a heavy weight, maybe a structural post within the shed, or more likely the post or stump used to support an anvil for cold forging. Lasansky (1980:7) and Light (1984:57) both describe the smith's anvil as mounted on a stump or mounting block often set several feet into the ground for support. The block had to be kept level and at the correct height for the smith to work. Sometimes the anvil was supported

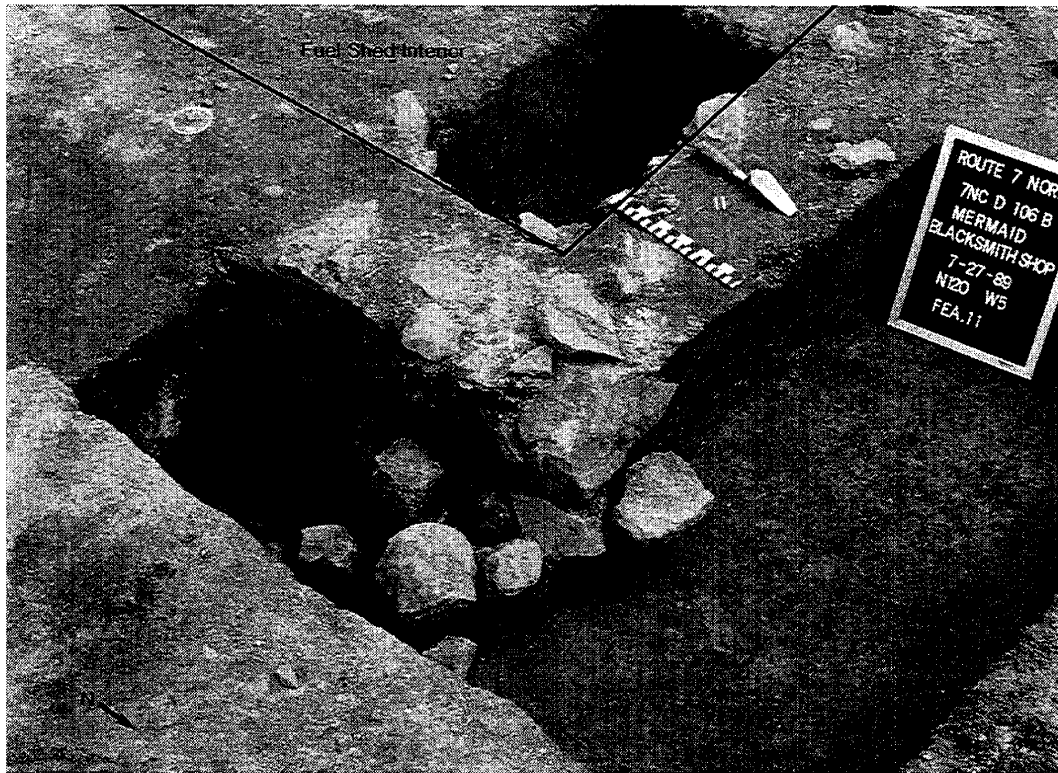
PLATE 8

Feature 11, Northeast Corner of Fuel Shed,
Prior to Excavation



PLATE 9

Feature 11, Northeast Corner of Fuel Shed, After Excavation



from the sides with stones or other packing materials, similar to the evidence seen in Feature 15. A second interpretation could be that the feature represents the remains of a quenching tub (Light 1984:58), a tub that could be placed in a pit or on top of the ground.

Exterior Features

Beyond the limits of the shoeing shed, shop, stable and fuel shed addition, there were several other features identified at the site. Table 10 summarizes these exterior features. Feature 40 was located behind the coal shed addition (N115E0). The feature was difficult to define due to the large amount of iron slag and clinker embedded in the dark brown to black soil. Over 21,700 grams of iron slag were recovered from the feature, along with 145 grams of brick, cut and wrought nails, four horse shoe fragments, bar stock, worked metal, a metal handle, a cultivator blade, iron sheeting, glass, and ceramic fragments (Plate 23).

TABLE 8
Summary of Coal Bunker or Fuel Shed Features

Feature	Unit	Dimensions	Description
11	N0 W5- N125 W0	122' long 1' wide	Dark linear stain of large stones and mortar; the remains of the rear wall of the blacksmith shop and the stable; interior walls and additions are present.
31	N110 W5	4.2' long 1.8' wide 1.45' deep	Post hole and mold. Dark brown silt loam with rocks supporting the post. Olive glass bottle base, brick, slag, and redware recovered. Post mold located along interior back wall of the shop, in the hypothesized addition.

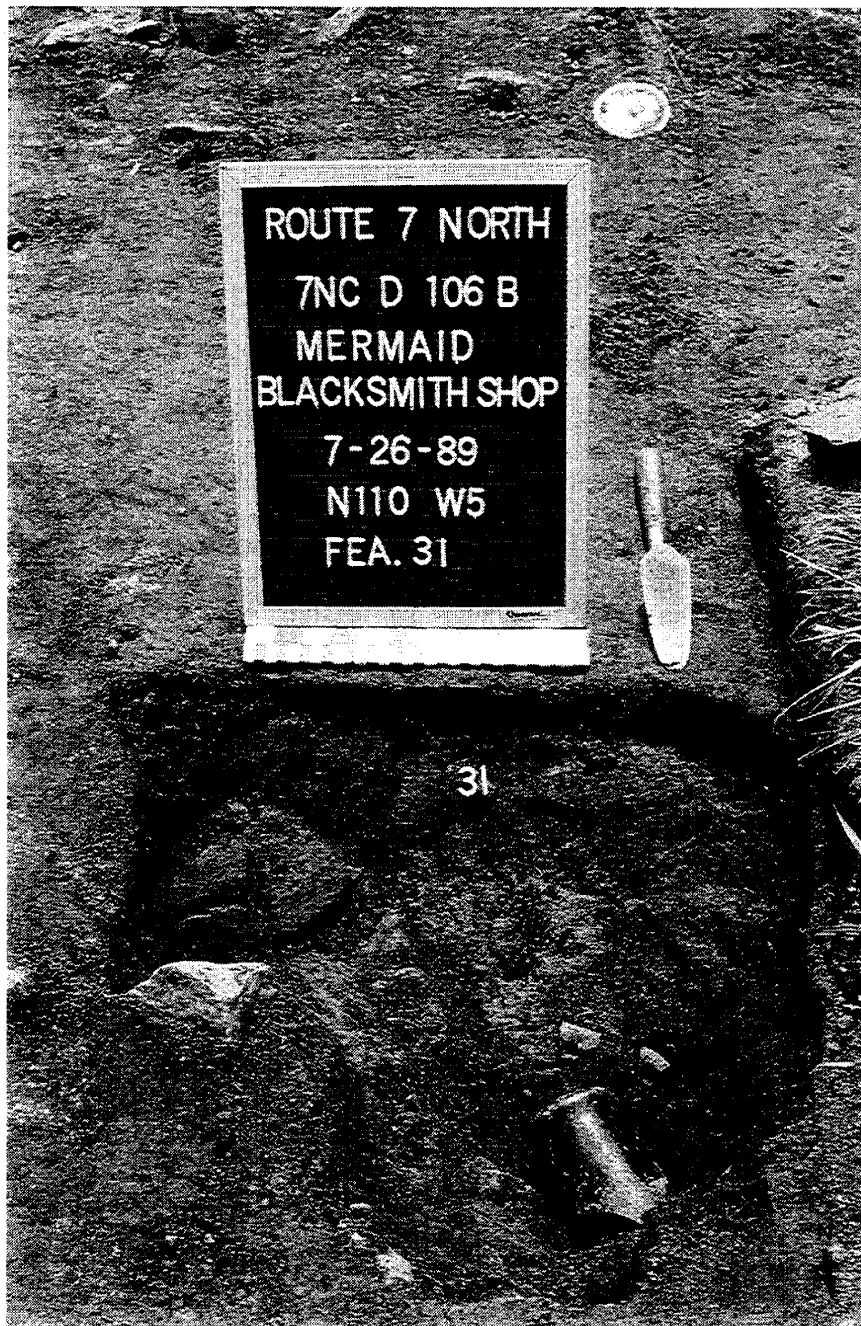
Features 7, 8, and 9, form a small feature complex east of the shoeing shed (Plate 24). Feature 8, measuring about 4' by 3', was a smaller version of the shoeing pits seen inside the shed (Features 2 and 4). Like the interior features, Feature 8 was only .4' deep and the bottom was irregularly shaped. The feature fill consisted of a dark brown clayey silt with schist, cobbles, brick fragments, glass, redware, bone and charcoal. Features 7 and 9 were posts with molds associated with Feature 8. Feature 7 was 1.0' deep, and Feature 9 was 1.5' deep. Diameters of both features were similar to their depths (1.0' and 1.5' respectively). Feature 9 exhibited evidence of shoring or support stones jammed in next to the post (Figure 25).

Feature 41 was located at N85E15, east of this small feature complex. The feature consisted of a dark brown silt loam and was roughly circular (about 2.0' in diameter) and very shallow (only .2' deep). Small amounts of slag, metal fragments, and nails were recovered. Feature 41 may have been some type of support post for a fenceline; it apparently was not directly related to the shop or shoeing shed addition.

Only two coins were recovered during the Phase II investigations at the site, and their utility in dating the additions or periods of construction for the shop are dubious. The first coin, a 1787 New Jersey Trade token, was recovered from the plow zone excavations from Test Unit N85E10, above the shoeing pit complex (Features 7, 8, and 9). The other coin was a 1797 Liberty Head cent found in the plow zone of Test Unit N110E5, east of Feature 40.

PLATE 10

Bottle Base (1790-1825) Recovered from Feature 31
(D34 No. 30)



- Feature number

PLATE 11

Feature 44, Located inside of Feature 11, (Fuel Shed Addition), After Excavation

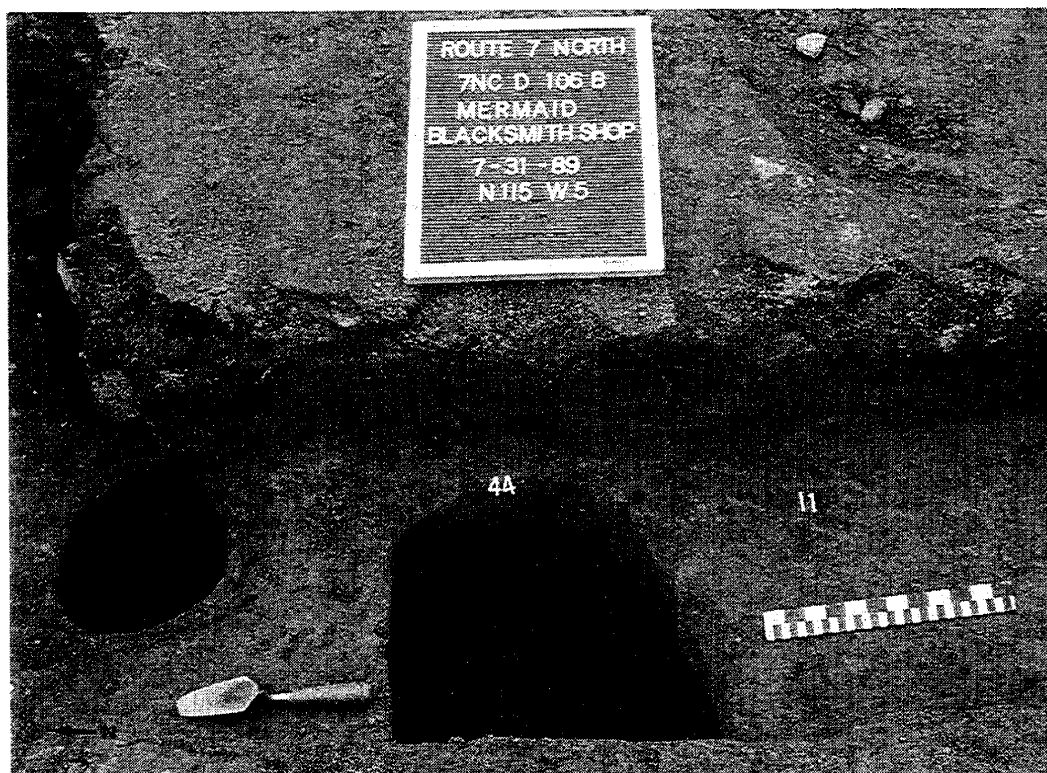
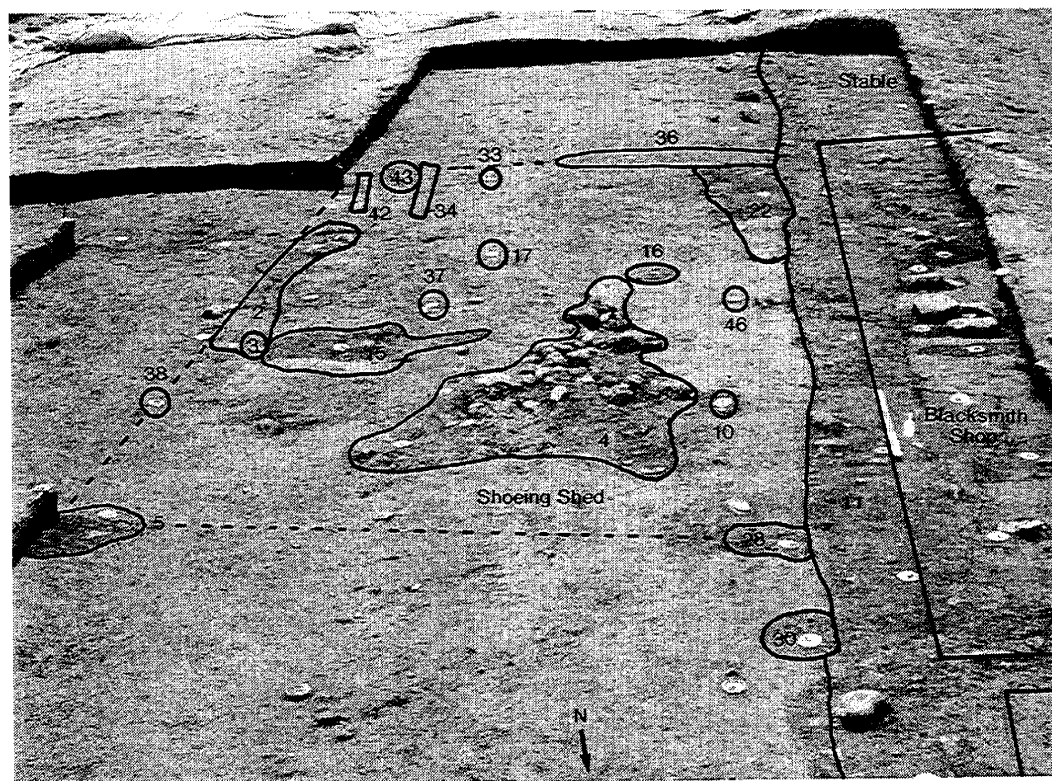


PLATE 12

- Feature number

Horseshoeing Shed Features, Prior to Excavation, Looking South



- Feature number

PLATE 13
Feature 36, Prior to Excavation, Looking North

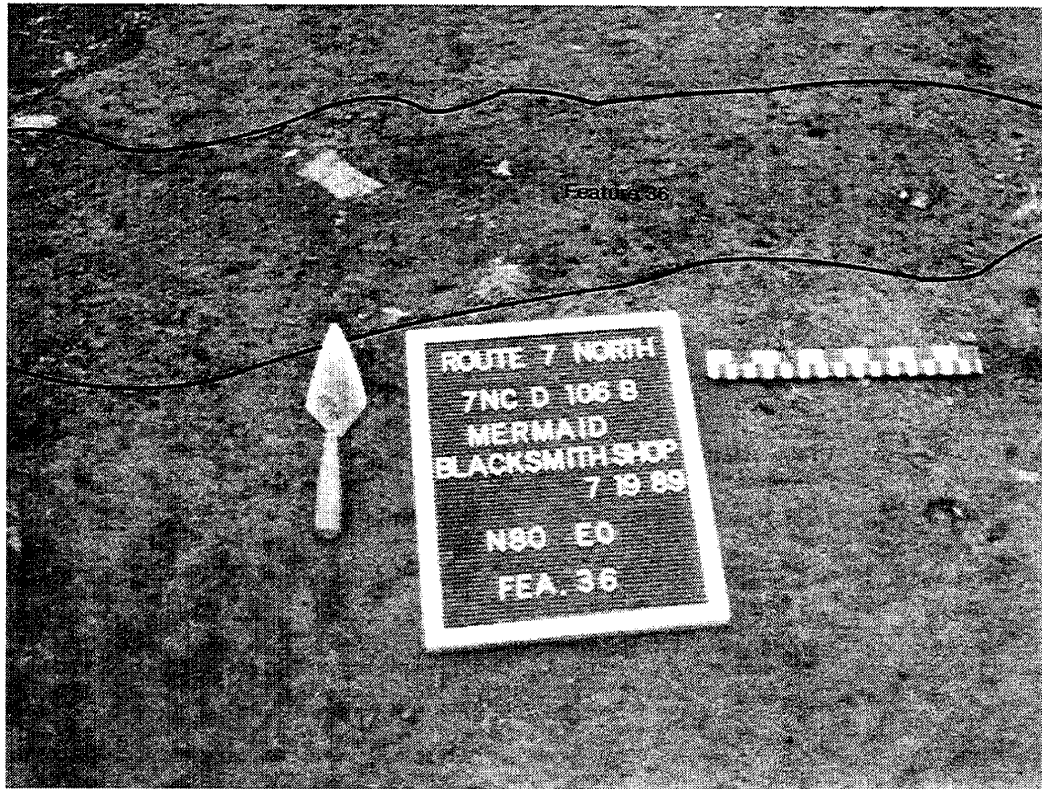


PLATE 14
Feature 5, Cross-Section

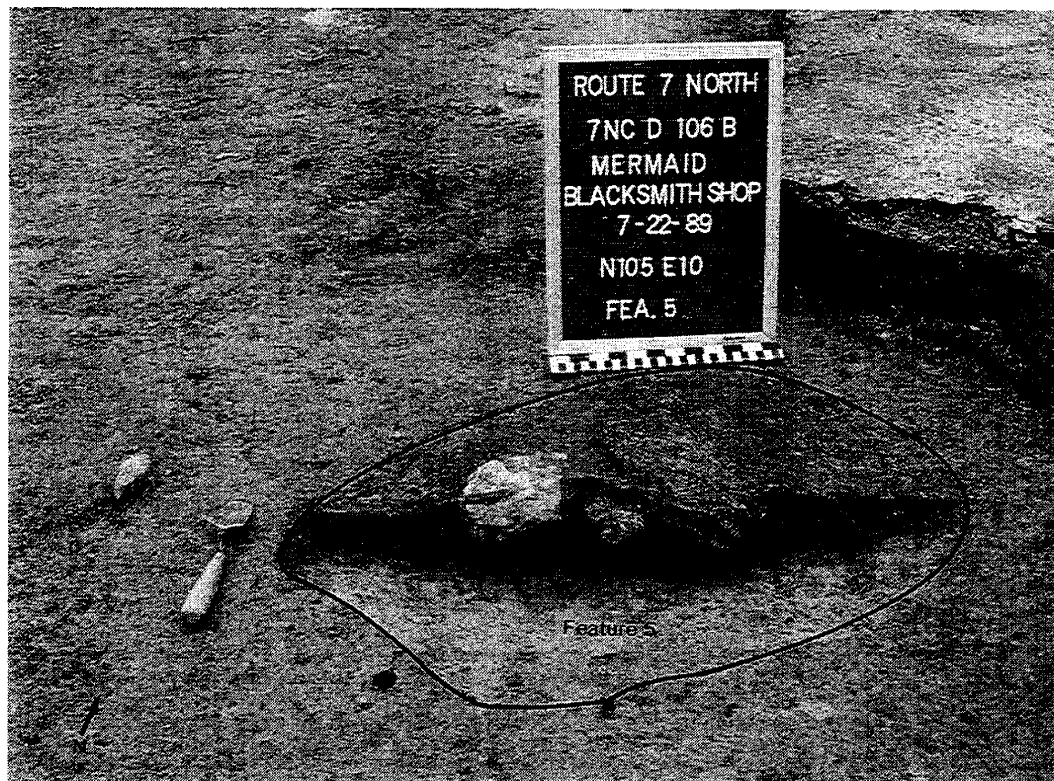
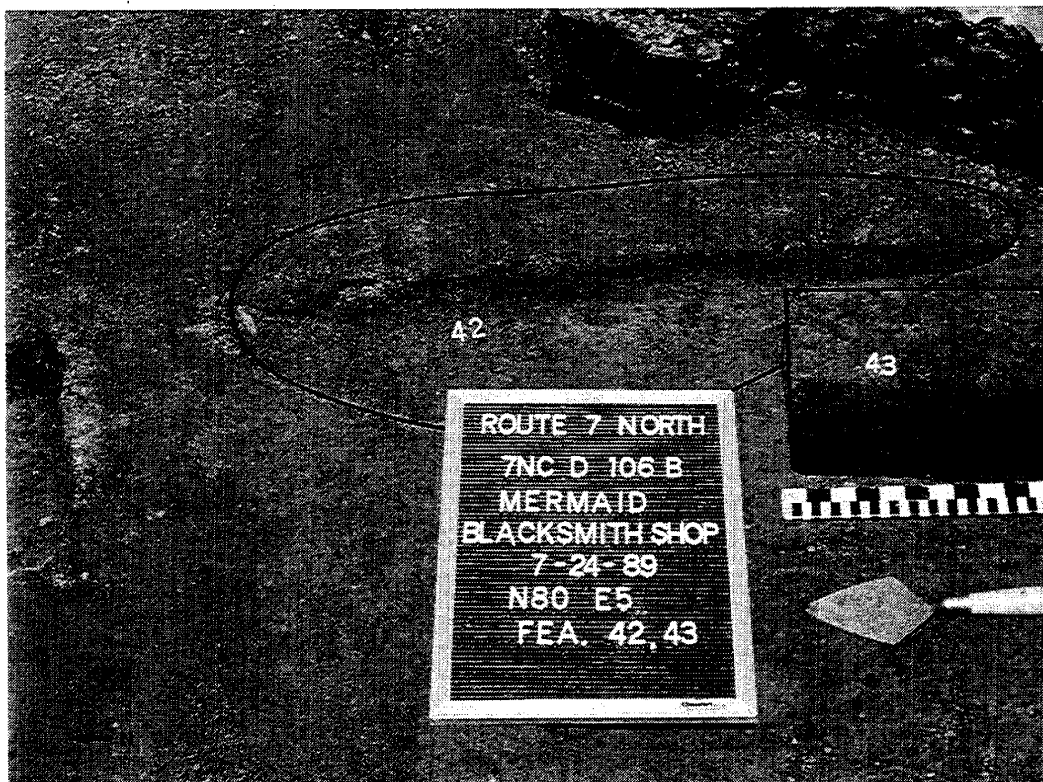


PLATE 15

Features 42 and 43, Cross-Section



- feature number

ARTIFACT ANALYSIS AND FAUNAL ANALYSIS

Prior to a detailed artifact analysis, the standard artifact processing procedures of the Delaware Bureau of Museums were applied to all artifacts recovered from the excavation. All artifacts were cleaned in the lab with plain water, or, in the case of deteriorating bone, shell, or metal, damp- or dry-brushed. Bone and shell were then placed in labeled bags. All other artifacts were labeled with the site number and a three-digit provenience number. Artifacts were sorted in categories for cataloging based on their material composition.

Over 6,800 artifacts were recovered from the plow zone testing at the Mermaid Blacksmith Shop. Appendix VII summarizes the number and types of artifacts found during the investigation. Of the total plow zone artifacts, ceramic fragments constituted the largest proportion of the assemblage (2,938 sherds or 42.6%), followed by glass (2,031 sherds or 29.5%), nails of various types (1,396 or 20.3%), bones, teeth and shell (384 fragments or 5.6%), prehistoric lithic artifacts (106 artifacts or

PLATE 16

Feature 37, After Excavation

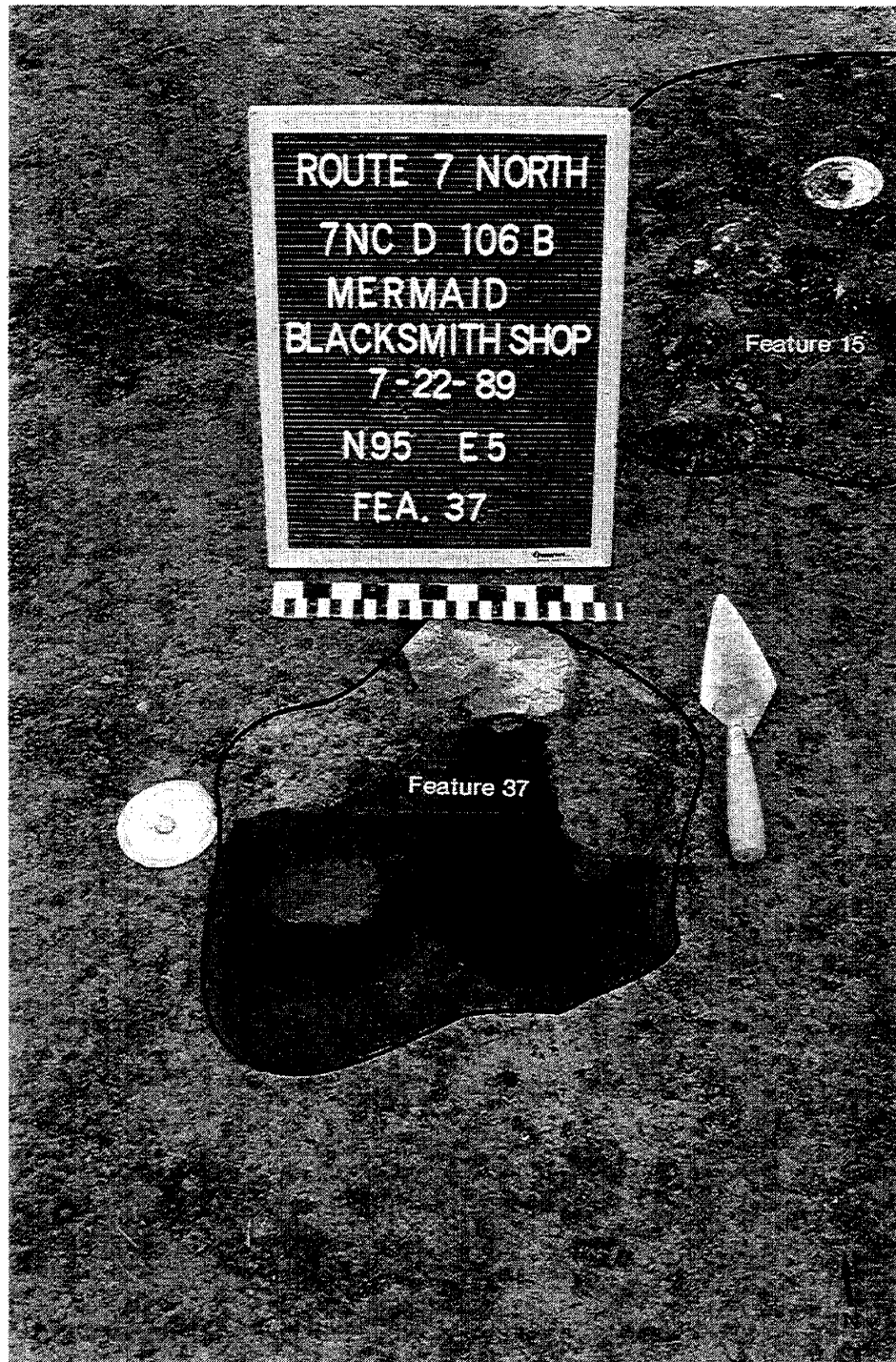
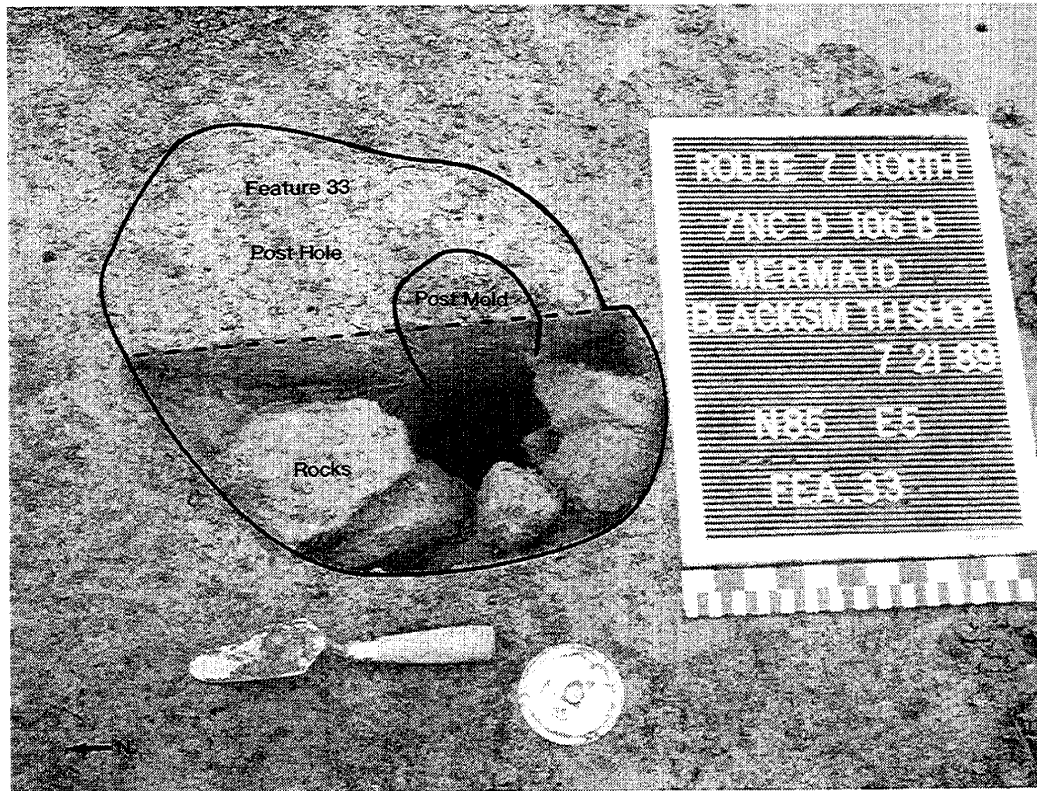


PLATE 17

Feature 33, Cross-Section

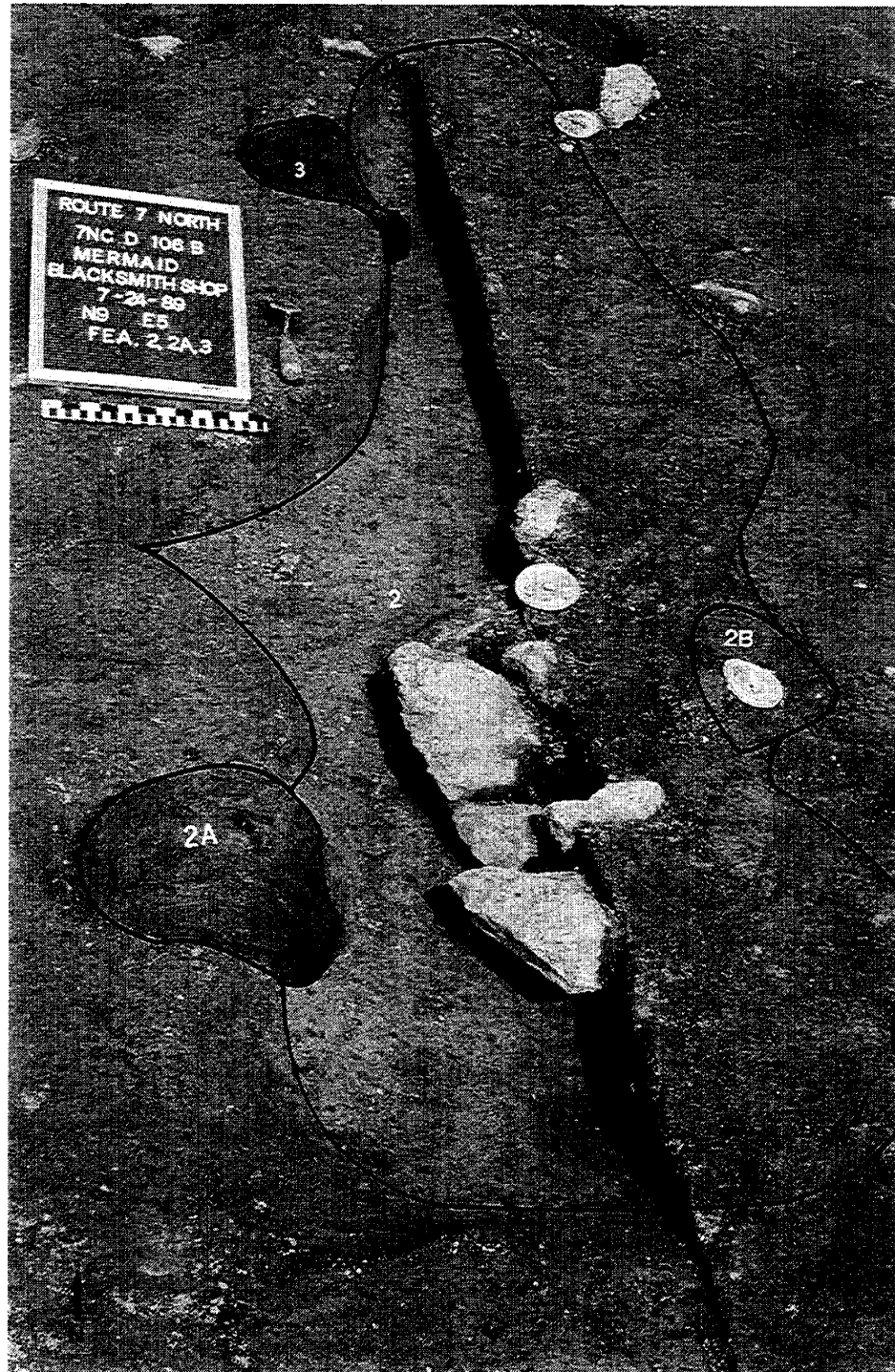


1.5%), and miscellaneous buttons, metal fragments, tobacco pipes, coins, and other artifacts (39 or .5%). Brick fragments weighing 15.7 kilograms, and mortar fragments weighing 1.7 kilograms were recovered during the plow zone sampling, along with over 55 kilograms of iron slag, 19.4 kilograms of scrap iron, and at least .5 kilograms of coal.

The faunal material recovered from the Mermaid Blacksmith Shop site consisted of 384 osteological specimens in generally poor condition. Of the total assemblage, 297 specimens were recovered from features and the remaining 87 specimens were recovered from test units and the plow zone. A 73 percent sample of the osteological material recovered from features was analyzed and is presented in Tables 11 and 12. The collection of bone from the site is too small to effectively analyze or compare to other sites. In general, there was nothing unusual about the faunal remains from the site. The largest amount of bone was recovered from Feature 11 (the rear wall of the stable, shop, and shed)

PLATE 18

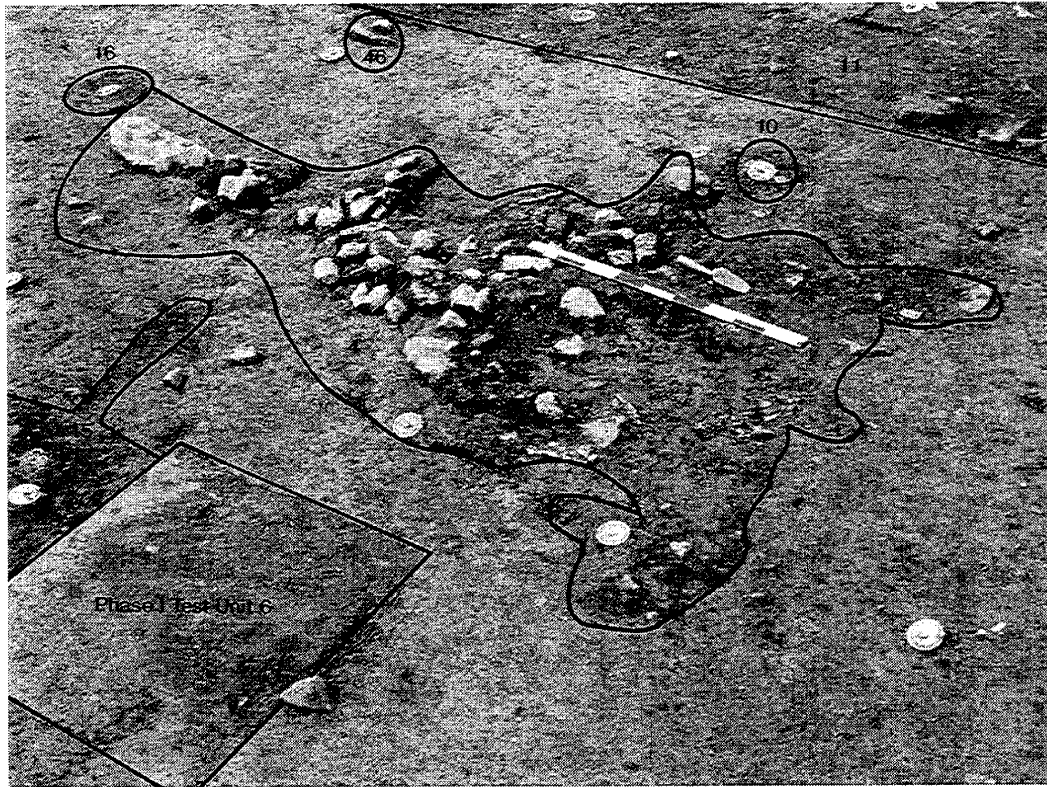
Feature 2, Cross-Section, Showing Intrusion of
Features 2A and 3



- Feature number

PLATE 19

Feature 4, Prior To Excavation



and included sheep, pig, cow, bird, rabbit, and rat. A sizeable number of these bones could not be attributed to specific species. Domestic species predominate in the collection, and the butcher marks indicate standard cuts of meat and probably remains of the smiths' meals.

The excavations at the Mermaid Blacksmith Shop site recovered a unique set of metal artifacts that only occur at smithies. In order to retrieve as much information as possible about the smiths' activities, a separate catalog sheet was prepared that would identify the many different iron and steel artifacts that were likely to be recovered (Appendix VIII). To ensure that the categories of objects were as complete as possible, a master blacksmith, Alphonsus Moolenschot of Rising Sun, Maryland, and an recreational bladesmith, John Huff of Delta, Pennsylvania, were consulted and examined the metal artifacts recovered from the site. The goal of the metals analysis was to determine what kinds of work were being done at the Mermaid Blacksmith Shop and what kind of materials the smiths were using.

PLATE 20

Feature 22 (Trash Debris Pile),
Prior To Excavation

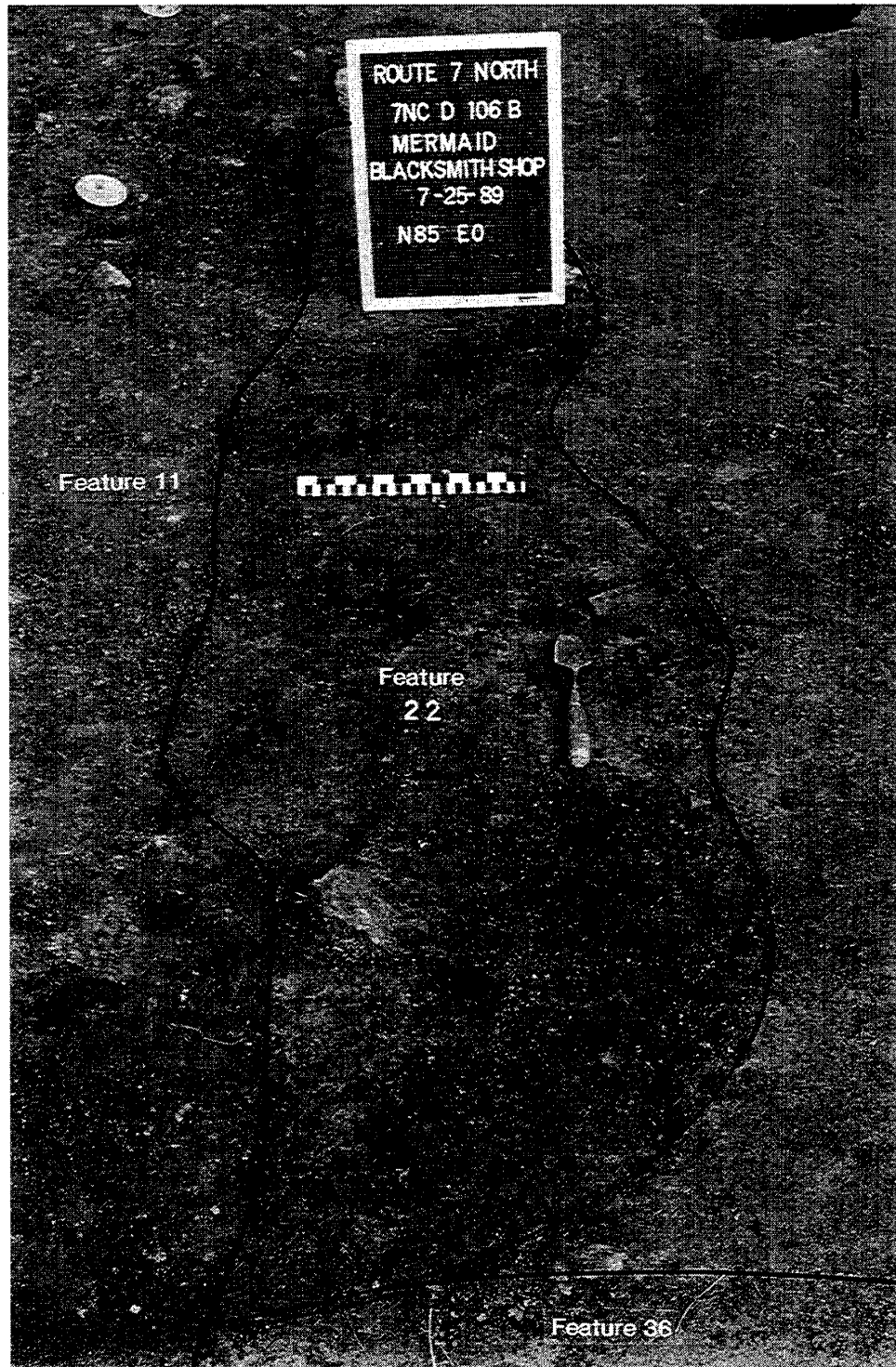
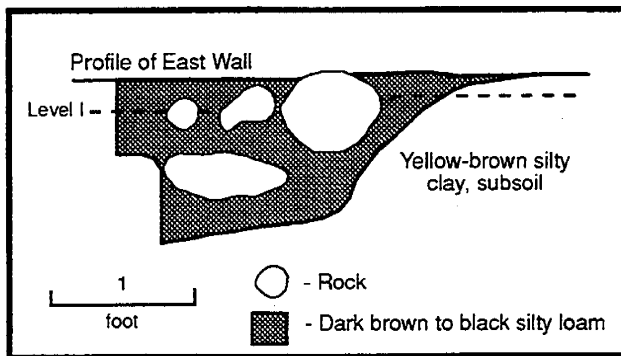


FIGURE 24
Profile of Feature 15



The Supplemental Metals Catalog Sheet was divided into five categories; Nails, Rivets, Miscellaneous Metal Objects, Miscellaneous Scrap, and Other. The Nails category, besides distinguishing between Wrought, Cut, Wire and Unidentified nails, also differentiated horseshoe nails in the assumption that the Mermaid smiths shoed horses. Rivets, used for numerous fastening

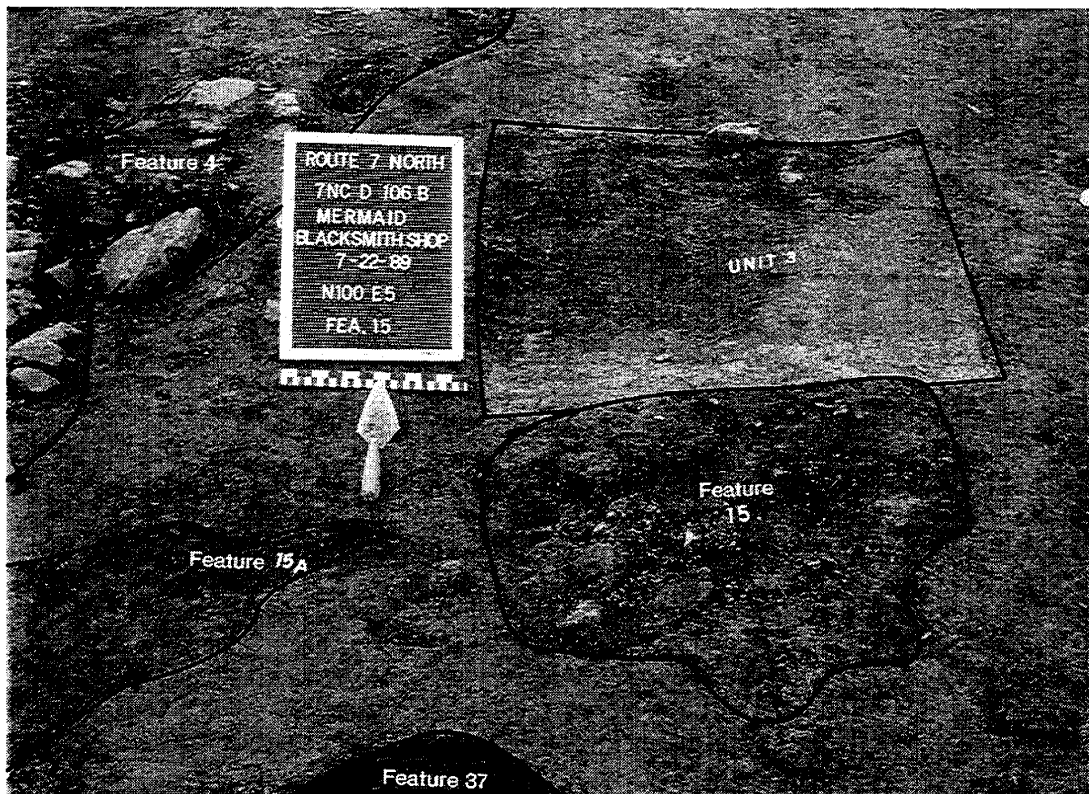
jobs, were divided into iron and copper. Historically copper is the material of choice for rivets, especially when attaching things to leather, so the presence of rivets would be indicative of harness repair. Miscellaneous Metal Objects consisted of the following artifact types; chain links, horse shoes, calkins (indicating whether or not machine-made or pre-made horse shoes were being used); washers, nuts, bolts, and screws (indicators of mechanical repairs); handles, and tools. Miscellaneous Scrap, in which both counts and weights were recorded, was divided into worked artifacts (those pieces that have signs of drawing, or shaping by hammers); Bar Stock (metals with a square or rectangular cross section); Round Stock (metals with a circular cross section); Iron Sheet, Copper sheet, and Cast Iron.

As expected a large number of variations representing a wide range of metal artifacts were recovered from the site. Most of these artifacts were recovered from plow zone contexts, or from Features 11, 4, and 2. The 1,994 fragments of iron scrap constituted the largest number of metal artifacts (Plate 25). The highest concentration of all the scrap types occurred in six contiguous units, N90W5, N90E0, N95W5, N95E0, N100W5, and N100E0. Bar stock was three times more common than round stock (Table 13). In particular 5/16th bar stock seems to have been standard (at some time) for the shop (Moolenschot, personal communication 1991). No piece of bar or round stock was over five inches long.

Nails were the second most numerous metal artifacts recovered. A total of 1,818 identifiable nails were retrieved from both plow zone and feature contexts (Table 13). Of these 937 (51.5%) were cut nails, 61 (3.4%) were wrought, 796 (43.8%) were horse shoe and 24 (1.3%) were wire nails. All but two of the horse shoe nails were bent and worn. The highest concentration of all the nail types

PLATE 21

Feature 15, Prior to Excavation



occurred in the same six contiguous excavations units as the scrap. The nails and scraps accounted for well over 90% of the metal recovered from the site.

Ninety-two fragments of worn out chain links of various sizes (Plate 26) were the next most common artifacts found. As with the scrap iron and nails, this artifact type was found primarily in the six contiguous excavation units noted previously. Four times as many rivets as bolts and screws were found at the site.

Tool parts recovered suggest the range of manufacturing and repair that the Mermaid smiths were engaged in, and represent farming, wood working, blacksmithing and domestic uses (Table 14; Plate 27). Twenty-four hand tool fragments were found, including auger bit fragments, draw knives, nine files, a hammer, a mortising chisel, a fragment of a plane blade, a stake anvil, fragments of scythes and sickles, an axe head, a pair of scissors, and three punches. Agricultural equipment parts that were recovered included a cultivator blade and two plow tips. A variety of other objects were also recovered

PLATE 22

Feature 15, Cross-Section



such as handles, pieces of horse tack (including horse shoes, bits, swivel hooks, hame clips, and a saddle tree bracket), wagon parts (portions of single and double trees, end clips, straps, and shoe bolts), and keys (Plates 28 and 29). Numerous unidentified rusted iron lumps were also recovered. In almost every instance the highest proportion of the artifacts occur in the same six contiguous excavation units that comprised the location of the shoeing shed. The majority of the metal artifacts were broken or worn out and usually in small pieces.

Ceramics recovered from both plow zone and feature contexts at the site are summarized in Table 15. Over 70% of the sherds recovered represent redware vessels, followed by much smaller representations of pearlware (14.4%), whiteware (6.1%), yellowware (3%), porcelain and bone china (2%), creamware (1.8%), and lesser recovered amounts of ironstone, tin-glazed earthenware, white salt-glazed stoneware, and unidentified fragments (1.8%).

TABLE 10
Summary of External Features

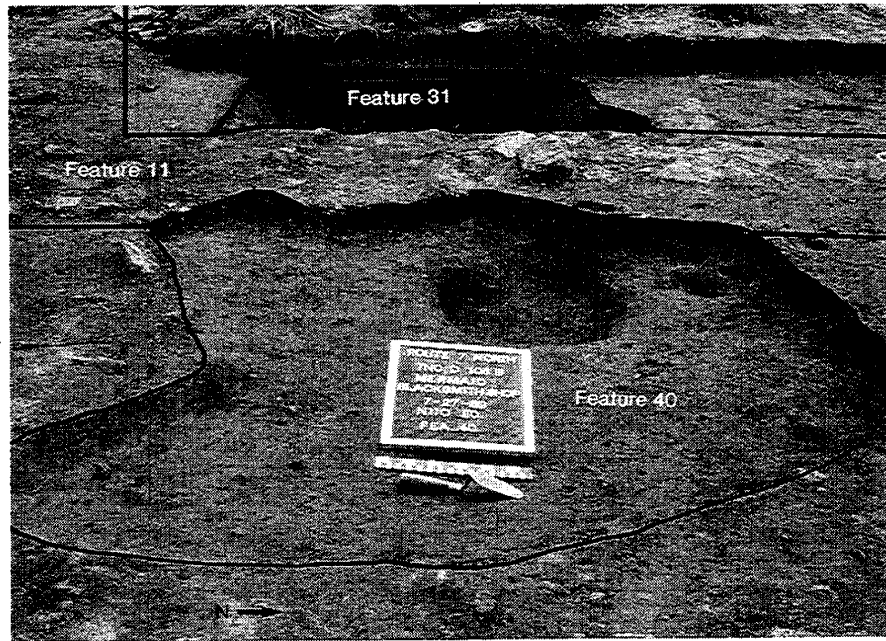
Feature	Unit	Dimensions	Description
7	N85 E10	1.0' diameter 1.0' deep	Roughly circular mottled yellow brown silty clay soil stain with brick and nail fragments. Possible post hole intruding into Feature 8.
8	N85 E10	4' x 3' 0.4' deep	Dark brown clayey silt, oval stain with ash, charcoal, chunks of schist, nails, bone, copper, and bricks. Intruded by Features 7 and 9.
9	N85 E10	1.5' diameter 1.5' deep	Consists of 9a and 9b, a mottled orange and clayey loam post hole with charcoal and a dark brown clayey loam post mold stain with charcoal and chinking stones.
40	N115 E0	5.0' diameter 0.2' - 0.8' deep	Large, irregular dark brown to black soil stain containing large amounts of iron slag, redware and whiteware. Located outside of back wall of shop addition, probably a trash pile.
41	N85 E15	2.0' diameter 0.2' deep	Roughly circular dark brown silt loam stain. Basin shaped and shallow. Slag, nails and metal fragments recovered.

Table 16 summarizes the ceramic fragments that were recovered from feature contexts at the Mermaid Blacksmith Shop. Of the 393 ceramic fragments recovered from features, 172 sherds (44% of the total) came from Feature 11, the rear stable and shop foundation wall. The shop wall feature contained redware, whiteware, pearlware, creamware, yellowware, white salt-glazed stoneware, tin-glazed earthenware, and porcelain fragments spread throughout the foundation trench. The scrap iron and slag debris that composed Feature 40 behind the fuel shed addition yielded only 84 redware and pearlware sherds (21.3%). Feature 4, the shoeing pit inside of the shoeing shed, produced thirty-five redware, creamware, and pearlware sherds (8.9% of the total). Feature 31, the truncated portion of Feature 40 located inside of the fuel shed addition, contained only 11 redware and creamware sherds (2.8% of the total). The remainder of the features contained small amounts of ceramic, and redwares comprised the balance of the sherds recovered throughout the features at the site.

Of all the features at the site, Feature 11 yielded the broadest range of ceramic types and vessels, and the majority of these vessels were hollow forms. Redware vessels recovered included fragments of a very distinctive dark brown bifacially glazed jug or pitcher from the southeastern end of the blacksmith shop; portions of this vessel were also found in Feature 27 (Plate 30). Sherds, including rim fragments, from at least two separate redware tankards, both with dark brown bifacial glazes, were

PLATE 23

Feature 40 (Trash Pile), Behind the Fuel Shed, After Excavation

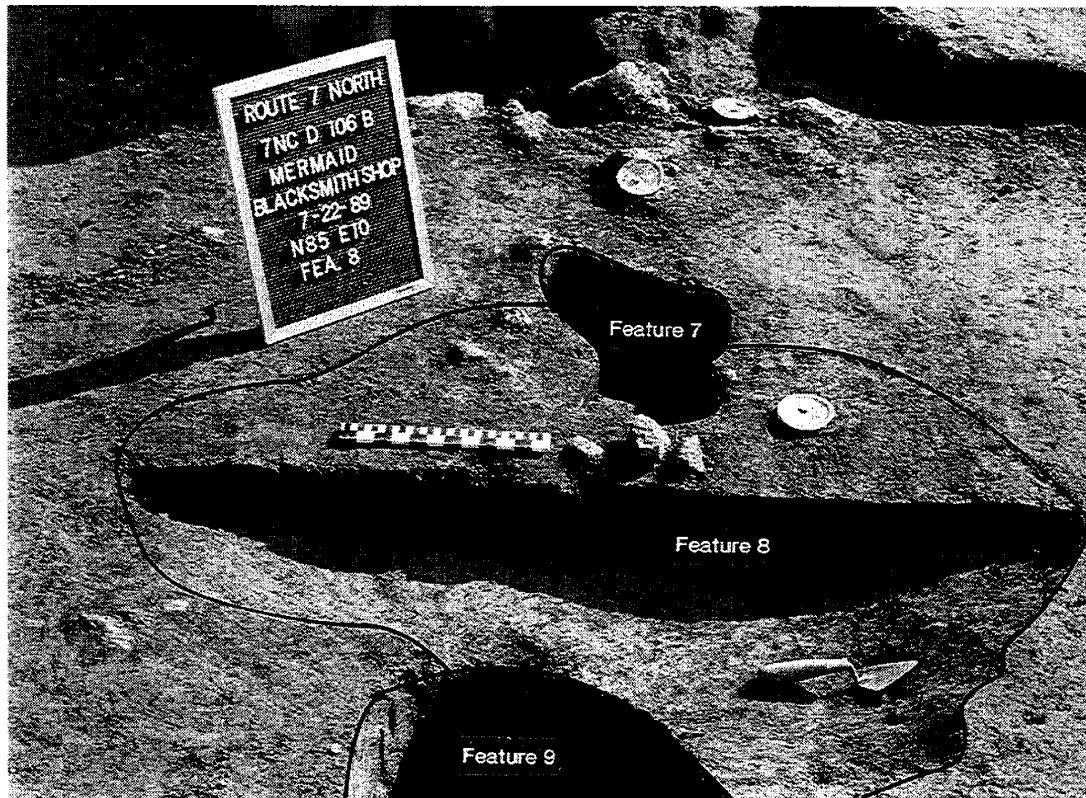


found along the length of the shop and fuel addition foundation walls, and also within Features 40 and 44. Sherds from possibly three slip decorated redware vessels, one with a coggled rim, were found in Test Units N80W5, N90W5, N105W5, and N120W5. Rim and base fragments of a redware butterpot were found in the foundation trench of the blacksmith shop. The remainder of the redware sherds from Feature 11, indeed for the majority of the ceramic fragments recovered from the feature, were generally small and badly exfoliated.

The sherds of one hollow form yellowware vessel, probably a 4 1/2" diameter pitcher, were found primarily in Test Unit N100W5, but were also found spread throughout Test Units N105W5, N105W10, and N120W5 (Plate 31). Fragments of a badly exfoliated whiteware baker, 2" deep and probably oblong in shape, with willow pattern decoration, were recovered from N110W5 (Plate 32). The presence of these vessels only in the northern end of the Feature 11 are useful in providing a rough chronology for the addition, suggesting a date after circa 1830 for the construction of the fuel shed.

PLATE 24

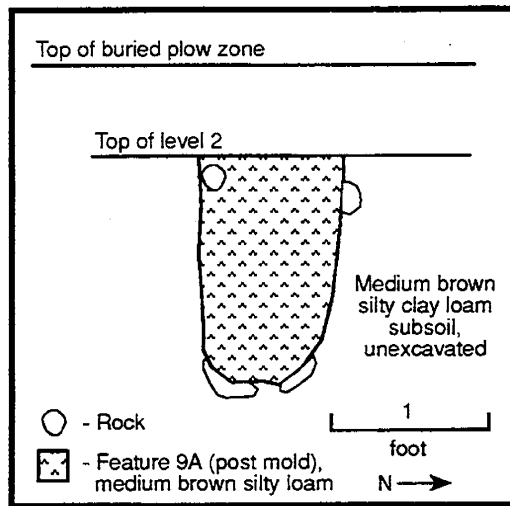
Features 7, 8, and 9, Cross-Sections



Sherds from three creamware vessels -- one cup and two other hollow forms -- were found in the Feature 11 soils, along with at least four other pearlware/whiteware vessels, including one annular, a green shell-edged flatware, and two hollow forms. Fragments of white salt-glazed stoneware ("scratch-blue") were found in Test Units N110W5 and N115W5. A small piece of tin-glazed earthenware, three pieces of a Chinese export porcelain cup and saucer, and several fragments of bone china complete the ceramic assemblage from Feature 11.

Where Feature 11 had the greatest variety of ceramic types, the other features at the site, particularly those associated with the shoeing shed, contained almost exclusively redware, pearlware, and creamware sherds. Crossmends and cross matches (ie., the sherds do not mend, but are extremely similar, suggesting the same vessel) were observed between Features 2, 17, 22, and 36. In this case all of these features contained portions of a distinctive narrow-necked redware jug with a shiny metallic

FIGURE 25
Profile of Feature 9



glaze, black exterior and brown interior. Cross matches were also apparent between Features 11, 40, 5, and 31 (one of the tankards mentioned above). Annular pearlware was recovered from Feature 15 (a mocha decoration) and from Features 32 and 33 (a blue and drab green decoration). The presence of creamware and pearlware, and no whiteware or ironstone sherds in the structural features associated with the shoeing shed suggests that the fragments were already in the blacksmith shop yard at the time of the construction of the shed, or were brought in from a secondary refuse

source. Based on the ceramic assemblage from the site, a possible date of construction for the shoeing shed would therefore be in the first quarter of the nineteenth century.

A minimum of five glass bottles were recovered from the blacksmith shop excavations, all from feature contexts. Three of these were black glass, dip-molded wine bottles dating between 1780 and 1825 (mean date circa 1804) (Plate 33). Parts of two of these bottles were found in Features 4 and 31; the third wine bottle was recovered exclusively from Feature 40. The fourth bottle from the site was a square gin liquor bottle of black-green color and dip-molded. Found in Feature 40, it dates between 1740 and 1840 (mean date 1790). Thus Features 4, 31 and 40 represent a late eighteenth to early nineteenth-century trash disposal at the site. The fifth bottle was recovered from Features 11 and 20, and was an amber oval strap flask made in a three-piece mold (post dating 1850). Probable date range is 1850-1917 (mean date 1883.5). This bottle could be related to the demolition of the shop and sheds.

ARTIFACT DISTRIBUTIONS

Plow zone distribution maps of the artifacts located in the core area of the site (N70 to N125 and W5 to E15) were computer-generated for several classes of artifacts and are shown in Figures 26 through 30. Artifact data for the distribution maps was not available for seven test units because these units were not screened during the excavation (N105E0, N110E0, N115E0, N70W5, N70E0, N75E0, N80E0, and N75E5). Generally, the artifact distributions reflect the debris associated with the shoeing

TABLE 11
Faunal Material Distribution by Feature

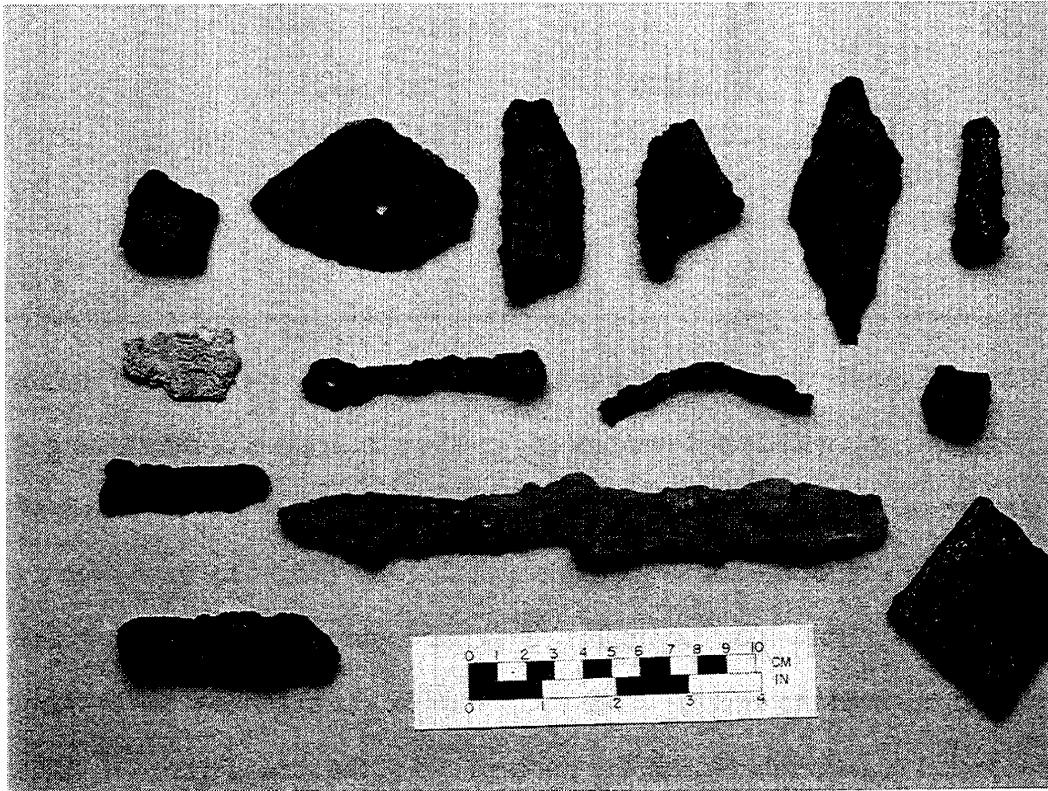
	Feature Number											Species Totals
	—	2	4	5	8	11	20	31	32	39	40	
Aves	1	---	---	---	---	28	4	---	1	1	---	35
Cow	---	1	1	5	---	17	---	3	---	---	---	27
Pig	---	---	---	---	---	12	---	---	---	---	---	12
Sheep/goat	---	---	---	---	---	2	---	---	---	---	---	2
Rabbit	---	---	---	---	---	4	---	---	---	---	---	4
Rat	---	---	---	---	---	5	---	---	---	---	---	5
Unidentified Mammal	1	2	3	1	3	111	---	6	1	---	1	129
Unidentifiable	---	---	---	---	---	3	---	---	---	---	---	3
Feature Total	2	3	4	6	3	182	4	9	2	1	1	217

TABLE 12
Faunal Material, Distribution by Species

Species	Number of Identified Specimens	Percent of Total	Modified	Age of Specimens	Minimum Number of Individuals	Number of Identified Specimens/Minimum Number of Individuals
Aves	35	16	---	---	4	8.75
Cow	27	12.5	2 chop 7 sawn 2 exfoliating	1 >1-1.5 y 1 >7-10 m	1	27
Pig	12	6	1 exfoliating	1 <1 y 5 <1-2 y 1 <24-27 m	1	12
Sheep/goat	2	1	---	1 <3-3.5 y	1	2
Rabbit	4	2	---	---	1	4
Rat	5	2	---	---	1	5
Unidentifiable Mammal	129	59.5	7 charred 1 sawn	---	---	---
Unidentifiable	3	1	---	---	---	---
Totals	217	100	20		9	

PLATE 25

Iron Scrap from Mermaid Blacksmith Shop and Stable Site



shed, the deep features located inside the shed (Features 4 and 2), the large garbage feature behind the fuel shed (Feature 40), and the demolition and/or razing of the stable and shop structure in 1912.

Ceramic distributions are predominantly associated with the filled shoeing pit features (Features 2 and 4), and spread throughout the interior of the shoeing shed. Creamware fragments were located mostly within the limits of the shed, centered on Features 4 and 2 (Figure 26). White salt-glazed stoneware and tin-glazed sherds were only recovered from within the plow zone units located inside of the shoeing shed. Pearlware fragments were found with more frequency than creamware sherds, and were concentrated most heavily in the area between Features 2 and 4, with a general scattering throughout the plow zone units associated with the shed (Figure 26). A small trash disposal area behind the stable was encountered at N70E5, and included modest counts of pearlware and whiteware sherds, brick, window glass, and molded glass.

TABLE 13

Summary of Nails, Mermaid Blacksmith Shop and Stable Site

Nail Type	Feature	Plow zone	Total
Cut	321 (76%)	616 (44.1%)	937 (51.5%)
Wrought	4 (1%)	57 (4.1%)	61 (3.4%)
Wire	0 --	24 (1.7%)	24 (1.3%)
Horseshoe	<u>97 (23%)</u>	<u>699 (50.1%)</u>	<u>796 (43.8%)</u>
Totals	422 (100%)	1396 (100%)	1818 (100%)
Barstock	117 (76.5%)	371 (82.3%)	488 (80.8%)
Roundstock	<u>36 (23.5%)</u>	<u>80 (17.7%)</u>	<u>116 (19.2%)</u>
Totals	153 (100%)	451 (100%)	604 (100%)

Whiteware sherds were more common in the plow zone units than in the features. Like the pearlware fragments, the whitewares were mostly concentrated inside of the shoeing shed, and seemed to concentrate in the vicinity of Feature 2. Pearlware and whiteware fragments seemed to extend beyond the southern wall of the shoeing shed, suggesting that there may have been a door or entrance into the shed from this direction (Figure 26). Both hard and soft paste fragments of porcelain were lightly spread throughout the interior of the shed, and like the pearlware and whiteware, there was a small concentration of porcelain outside the southern end of the shed (Figure 27). Ironstone fragments were sparse in the plow zone and were also concentrated inside the shed (Figure 27).

The distribution of yellowware sherds was different from the other ceramic types. The yellowware fragments were concentrated along the rear wall of the shop and fuel shed addition (Figure 27). This distribution may be indicative of a date of construction for the fuel shed between 1830, the beginning date for yellowware production, and 1912, the date that the shop and sheds were razed.

Bottle glass fragments recovered from the plow zone displayed similar distribution patterns to those seen with the ceramics. Sherds of bottle glass, household, and table glass were found in four primary locations: associated with Feature 4, spread throughout the inside of the shed, around the immediate limits of the shed, and in a trash disposal area mentioned earlier behind the stable (Figure 28). Tobacco pipe fragments were very sparse in both feature and plow zone contexts, and their distribution did not conform to that of any other artifact concentrations. The few pipe and bowl fragments that were found were located to the south of the shoeing shed, between the suspected

PLATE 26

Chain Links from Mermaid Blacksmith Shop and Stable Site



doorway and the trash disposal area behind the stable.

The low density and nature of the distributions of ceramics, glass, and tobacco pipes at the Mermaid Blacksmith Shop site indicate that the shop did not function as a domestic structure. Rather, the domestic artifacts recovered were suggestive of trash disposal in secondary refuse, or as part of feature fill.

The distribution of brick fragments, of iron slag, coal, scrap iron, nails, and window glass are however, more indicative of the blacksmith shop and its supporting additions. There were comparatively few wrought nails recovered from the site, suggesting that making nails was not a major concern of the smiths at the Mermaid site (Figure 29). The distribution of cut nails in the plow zone along the rear wall of the shop and stable and inside the shoeing shed, may, like the yellowware sherds at the fuel addition, provide a tentative date of construction for the complex, sometime after circa 1800,

TABLE 14
Summary of Smithing-Related Metals

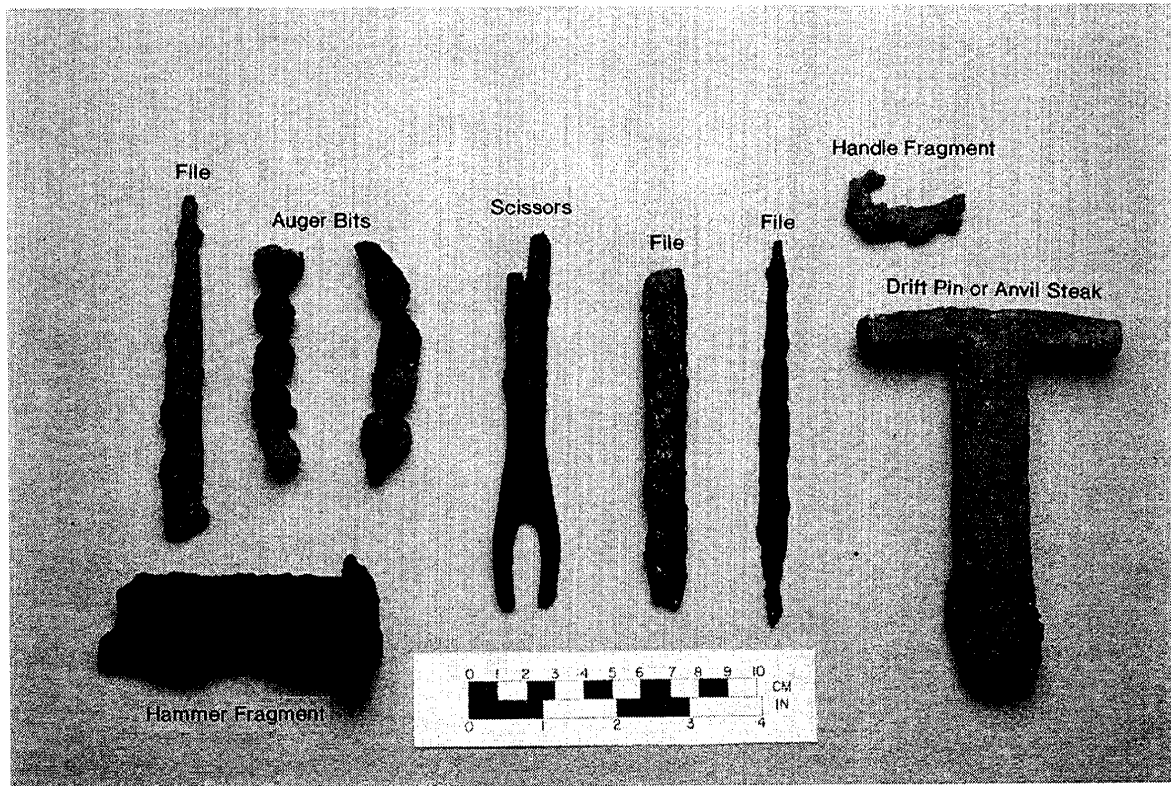
Hand tools		Horse tack (cont.)	
Woodworking		Swivel hook	1
Augers	3	Snaffle bits	2
Plane blade	1	Saddle tree bracket	1
Mortising chisel	1		
Blacksmithing		Agricultural	
Files	9	Plow tips	2
Hammer fragment	1	Sickle bar mower points	2
Drift pin anvil stake punch	1	Cultivator blade	1
Agricultural		Harrow spike	1
Sickle fragment	1	Draft equipment fragments	
Scythe fragment	1	Horse tree end clips	1
Other		Wagon tongue mounts	1
Scissors	1	Shoe bolts	2
Axe head	1		
Hoof ice pick	1	Iron scrap	
Knife handle	1	Plow zone	
Keys	2	Bar	371
Horse tack		Round	117
Horseshoes	14	Feature	
Hame clips	6	Bar	80
Bridle buckle, chain links, and hooks	76	Round	36

when cut nails became the norm (Mercer 1976) (Figure 29). There was also a general absence of wire nails at the site, indicating that the structures were already in place by the time wire nails became common. Also, that there were probably few repair jobs at the site (no doubt due to the stone construction of the stable, shop, and sheds). A small concentration of wrought, cut, and wire nails at N75W5, along with brick fragments, may indicate a disposal area, or perhaps one of these repair locations.

The distribution of window glass at the site may be indicative of either window locations or trash disposal areas, or, a combination of both (Figure 29). There was a dense concentration of window glass in the plow zone units above Feature 4 - perhaps the location of a rear shop window or archaeological evidence for the filling of the shoeing pit. A similar, though smaller peak of window glass was found in the vicinity of Feature 22, inside the shoeing shed, again suggesting either a window location in the shop wall or trash disposal. Window glass distributions also suggest that a window may have been located in the southeastern corner of the shoeing shed, in the rear wall of the coal shed, and

PLATE 27

Tools Recovered from Mermaid Blacksmith Shop and Stable Site



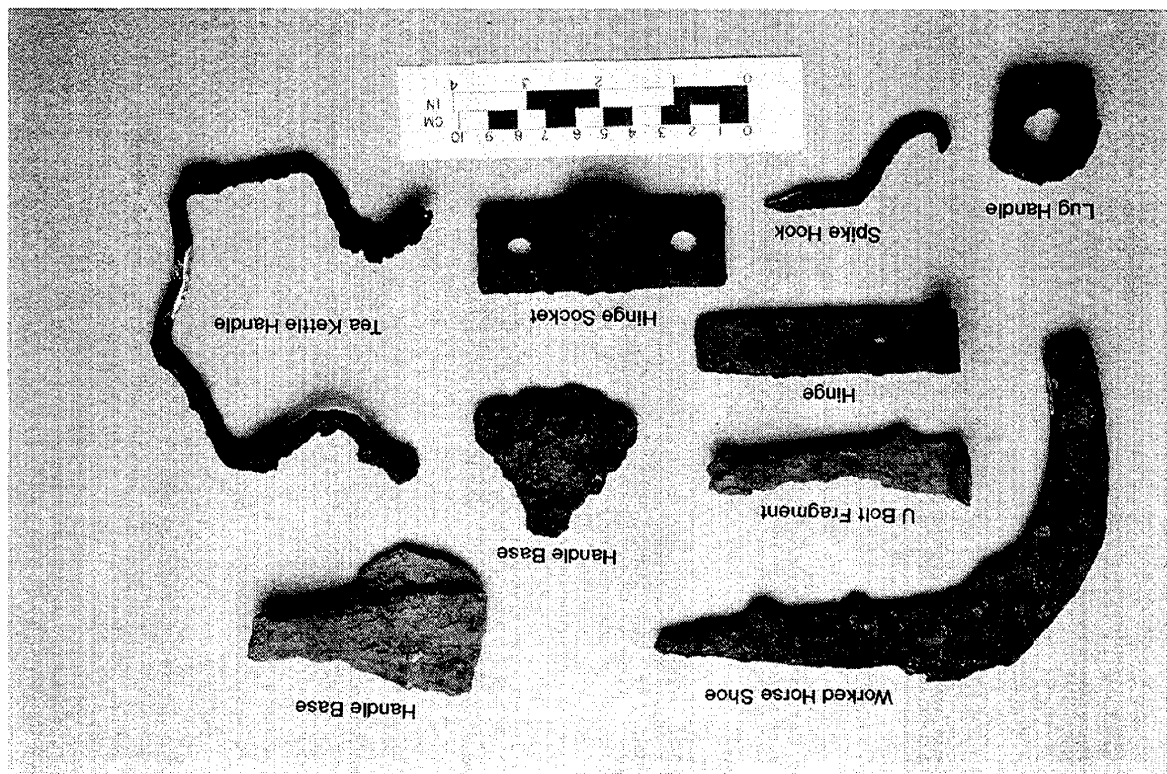
perhaps in the stable wall at N75W5. Much smaller concentrations were found above Feature 40.

Figure 30 illustrates the distribution of brick fragments by weight (in grams) across the site. The most dense concentration of brick was located inside the shop along the rear stone wall, perhaps indicating the approximate location of the hearth and forge. Certainly the large amount of burned brick and metal in Feature 18 supports this conclusion. A smaller peak of brick was located along the rear foundation wall at N75W5 (mentioned above), and a third peak was located in the area behind the stable. Finally, a large scattering of brick was found throughout the plow zone above the shoeing shed, perhaps indicating feature fill or the plow-smeared remnants of the hearth and forge.

Iron slag (Figure 30) was heavily concentrated within the limits of the shoeing shed, suggesting that the slag is associated with the features inside of the shed (Features 2 and 4). Additionally, slag was found concentrated in the plow zone above Feature 40 (the trash area behind the fuel shed), and in a

PLATE 28

Assorted Metal Objects from Mermaid Blacksmith Shop and Stable Site



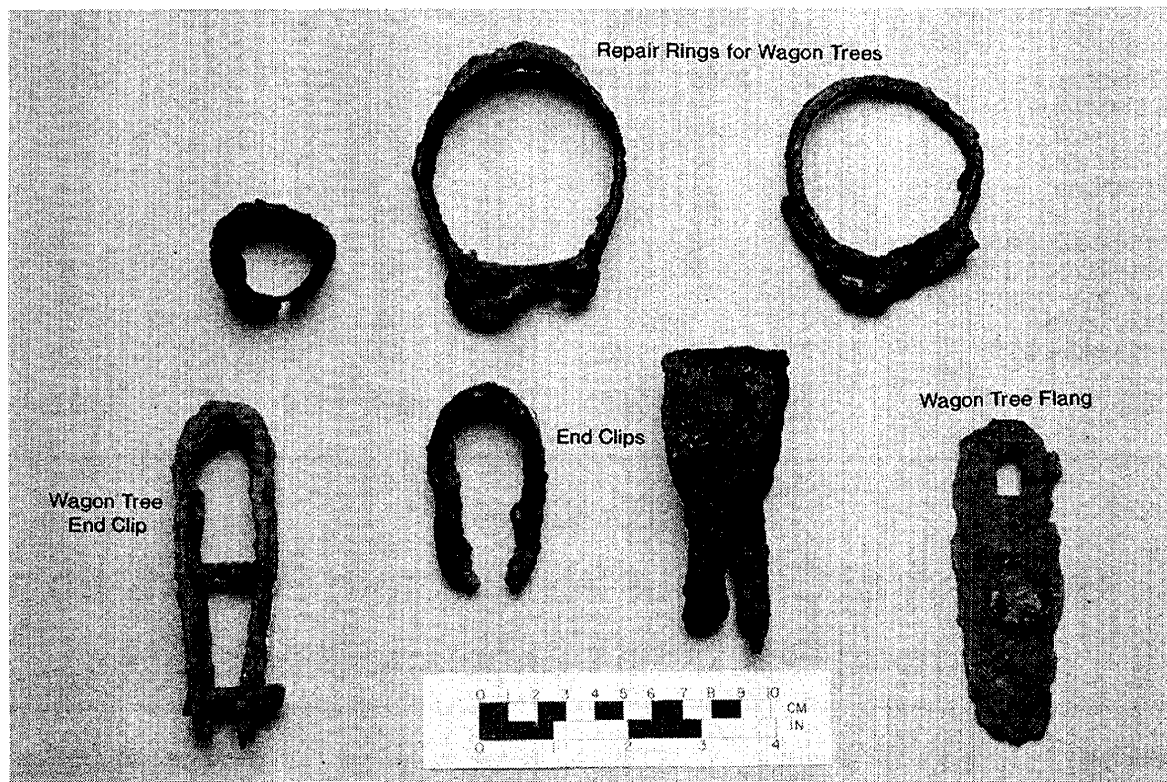
smaller concentration north of the shoeing shed, perhaps suggesting a northern doorway into this structure.

The distribution of scrap iron (Figure 30) was similar to the distribution of slag, but also exhibited some minor variations. The most dense concentration was again associated with the shoeing shed and particularly over Feature 4, but also with Feature 2 and the exterior shoeing pit east of the shed (Feature 8). Scrap iron was also concentrated in the plow zone above Feature 40.

Coal distributions were very different from the other blacksmith-related artifacts (Figure 30). Coal was recovered only from the area within the limits of the fuel shed, providing the archaeological evidence for interpreting that addition as a coal bunker.

PLATE 29

More Assorted Metal Objects from Mermaid Blacksmith Shop and Stable Site



SOIL CHEMICAL ANALYSIS

The analysis of soil chemicals from plow zone contexts at the Mermaid Blacksmith Shop was conducted because it has been shown that archaeologically-derived patterns or concentrations of certain soil trace elements can be correlated with the occurrence of specific activities that are reflective of site usage or human behavior (Evans 1978:64-80; Sopko 1983:24-30; McManamon 1984; Custer et al. 1986; Stone et al. 1987; Pogue 1988; Holliday 1992). The analysis of anthrosols, or soils whose native traits have been significantly altered by human activities (Eidt 1985:151), provides archaeologists with a generalized view of the spatial utilization of a site. Soils analysis can also be useful in determining intra-site activity areas, especially when used in conjunction with artifact distribution data from plow zone contexts. The results of soils analyses at several other sites in Delaware have proven the usefulness of this procedure (cf. Coleman et al. 1985; Custer et al. 1986; Shaffer et al. 1988:132-141;

TABLE 15

Summary of Ceramic Types, Mermaid Blacksmith Shop and Stable Site

Ceramic type	Plow zone		Feature		Total	
	#	%	#	%	#	%
Redware	2105	71.6	257	65.2	2362	70.9
Creamware	38	1.3	23	5.8	61	1.8
Pearlware	443	15.1	38	9.6	481	14.4
Whiteware	163	5.5	39	9.9	202	6.1
Ironstone	15	.5	0	—	15	.5
Yellowware	73	2.5	26	6.6	99	3.0
White salt-glazed stoneware	8	.3	3	.8	11	.3
Tin-glazed earthenware	8	.3	1	.25	9	.3
Hard paste porcelain	62	2.1	3	.8	68	2.0
Bone china			3	.8		
Unidentified	23	.8	1	.25	24	.7
Total	2938	100.0	394	100.0	3332	100.0

TABLE 16

Summary of Ceramics from Feature Contexts from Mermaid Blacksmith Shop and Stable Sites

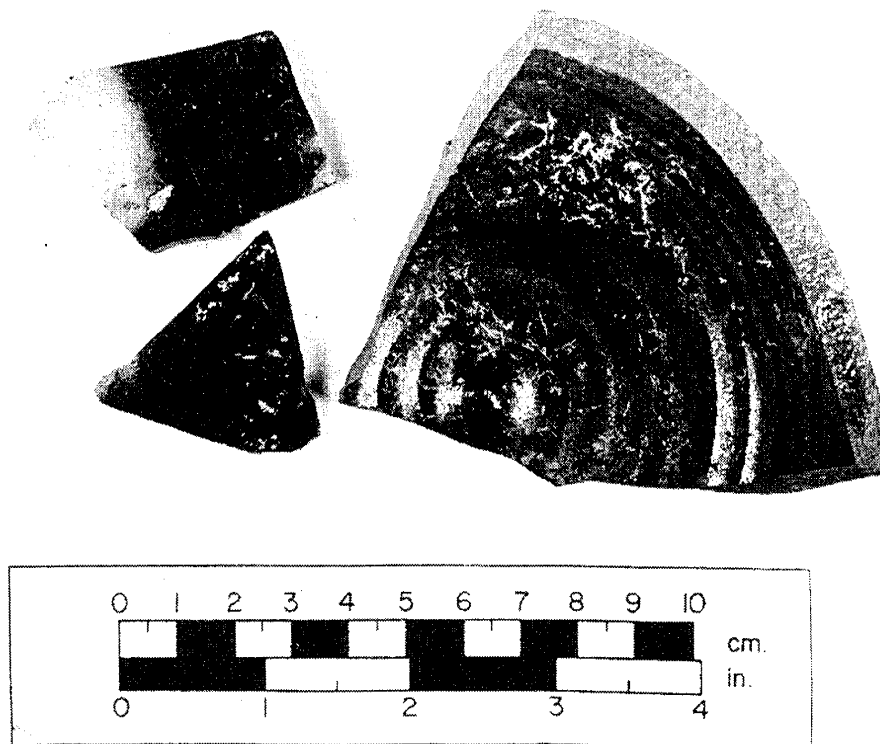
Ceramic Type	Feature #																				Total
	11	2	4	5	8	9.1	9.2	10	15	16	17	19	20	22	27	28	31	32	33	36	
Redware	86	6	24	8	4	1	2	9	3	1	1	1	11	2	3	—	10	—	1	9	256
Creamware	10	—	4	—	—	—	—	—	—	—	2	—	—	—	—	5	1	—	—	1	23
Pearlware	4	—	7	—	—	—	1	—	6	—	—	—	—	—	—	—	—	1	1	—	38
Whiteware	37	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	39
Ironstone	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Yellowware	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26
Stoneware (white)	2	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	3
Tin-glaze	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Hard Paste Porcelain	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
Bone China	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
Unidentified	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
Total	172	6	35	8	4	3	3	10	9	1	3	1	12	2	3	5	11	1	2	10	393

Catts and Custer 1990:180-190; De Cunzo et al. 1992:250-258). At the Mermaid Blacksmith Shop site soil samples from the buried A horizon were collected from the southwest corner of thirty-eight of the excavated test units.

The chemical analyses of the soils at the Blacksmith Shop were provided by the Soils Laboratory of the University of Delaware College of Agriculture. Basically, the soil samples were tested for the presence of what are termed macronutrients by soil scientists: potassium, phosphorus,

PLATE 30

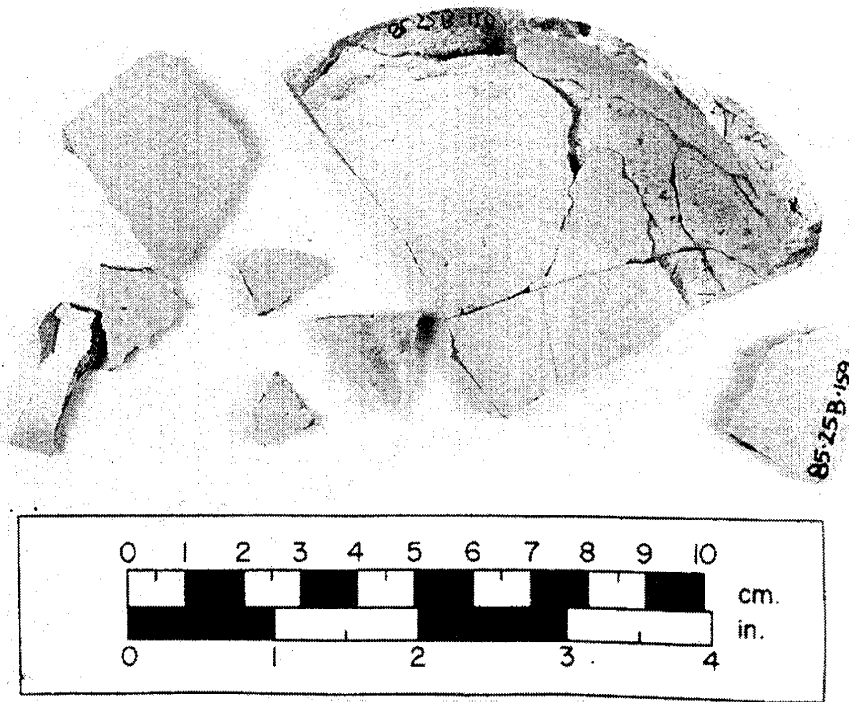
Redware Jug or Pitcher, Mermaid Blacksmith Shop and Stable Site



magnesium, and calcium. The soil pH was also recorded. Since healthy plants require significant amounts of these macronutrients to survive, most soil testing laboratories test for their presence (Brady 1974:19-28; Pogue 1988). Of the four macronutrients tested, the level of phosphorus in site soils is the best indicator of human or animal activity, because phosphorus is a relatively stable chemical and is present in human and animal wastes and bone (Eidt 1985:180). In particular, high phosphorus accumulation is caused by the deposition of human and animal urine, excrement and organic refuse (Sjoberg 1976; Eidt 1977). Like phosphorus, calcium is a relatively stable element and will likely survive for long periods of time in soils. Calcium is a major component of bone and shell, and is also found in wood. Calcium found in large concentrations in soils could be indicative of several factors: agricultural fertilization (such as liming with shells as well as crushed limestone), oyster, clam or bone

PLATE 31

Yellowware Vessel, Mermaid Blacksmith Shop and Stable Site



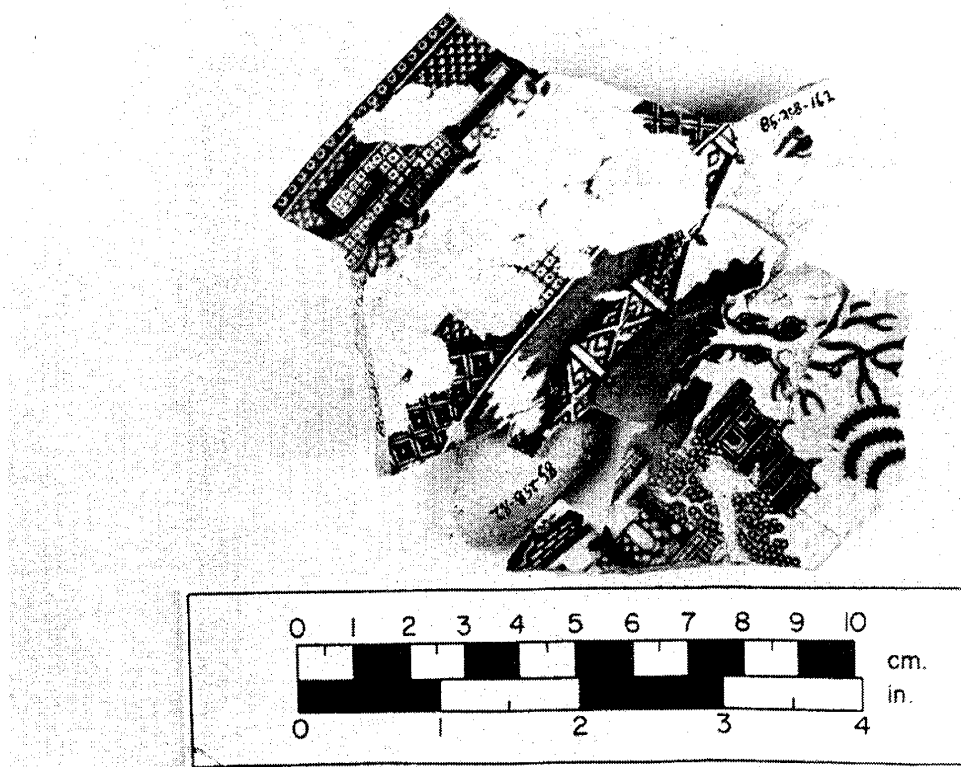
deposition, or the presence of building materials, such as mortar.

The elements of magnesium and potassium are not as stable in soils as calcium and phosphorus, and their presence in soils may be more dependent on microenvironmental factors (Pogue 1988:3). The main element in wood is potassium, but some magnesium is present as well; magnesium can also be related to calcium levels. High levels of potassium are the result of the deposition of wood ash, through surface burning, or through the dumping of fireplace or stove ashes, though the analysis of soils conducted by Pogue (1988) at the King's Reach site found that areas of "intense burning" will also have higher values of calcium and magnesium.

Soil pH can be greatly effected by land use practices that will often be reflected in the levels of other soil chemicals at the site (Eidt 1985:165-168). Soil pH readings of 7.0 or greater are indicative of alkaline soils, and pH reading below 7.0 are acidic. In Delaware soil pH values are naturally acidic

PLATE 32

Whiteware Baker, Mermaid Blacksmith Shop and Stable Site



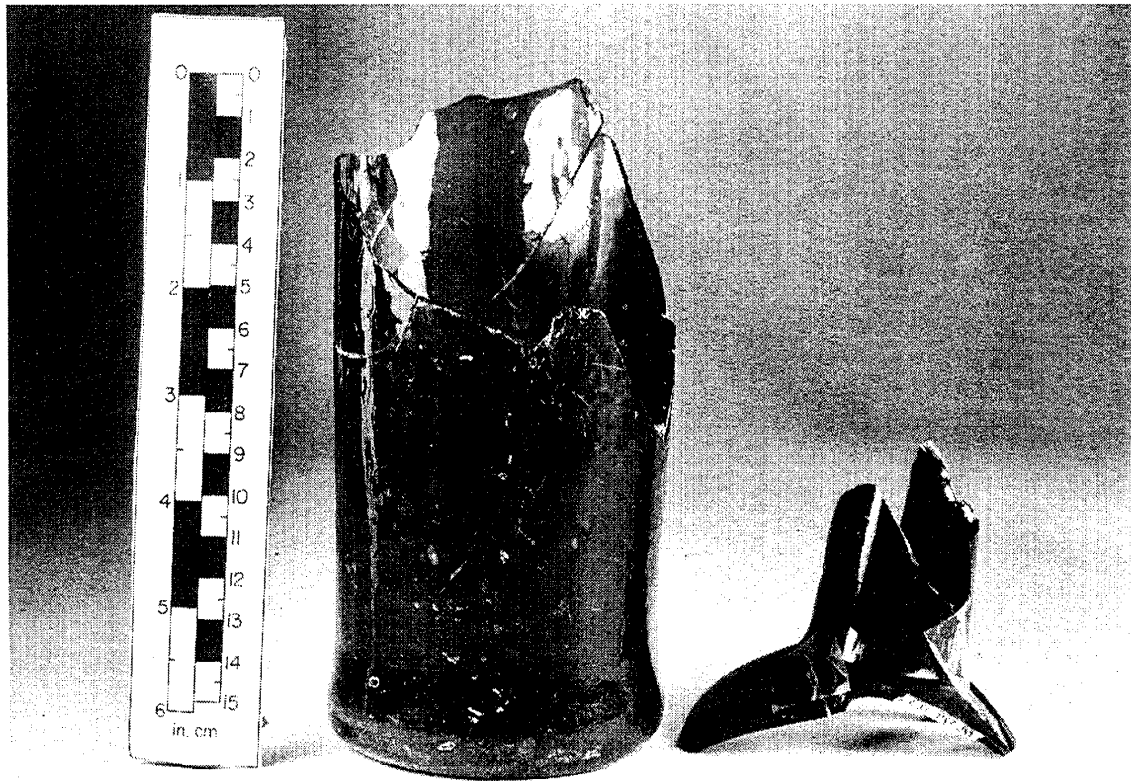
(Mathews and Lavoie 1970), and readings above 6.0 suggest agricultural fertilization (Custer et al. 1986).

Phosphorus: A generally high level of phosphorus was encountered along the rear wall of the stable and blacksmith shop, undoubtedly associated with horse manure and other organic materials (Figure 31). An especially high density of phosphorus was located in the vicinity of N30E0 coinciding with the interior partition wall identified during the excavations. No high levels of phosphorus were identified in the shoeing shed area of the site.

Potassium: Potassium levels were highest in the area associated with the shoeing shed (centering on N90E5), and near the southern end of the site (below the N30 line) (Figure 31). Potassium levels are linked to wood ash and wood remains, and it is likely that the levels encountered at the Mermaid Blacksmith Shop and Stable are related to the wooden superstructures and roofs of the shoeing shed and

PLATE 33

Bottles from Mermaid Blacksmith Shop and Stable Site



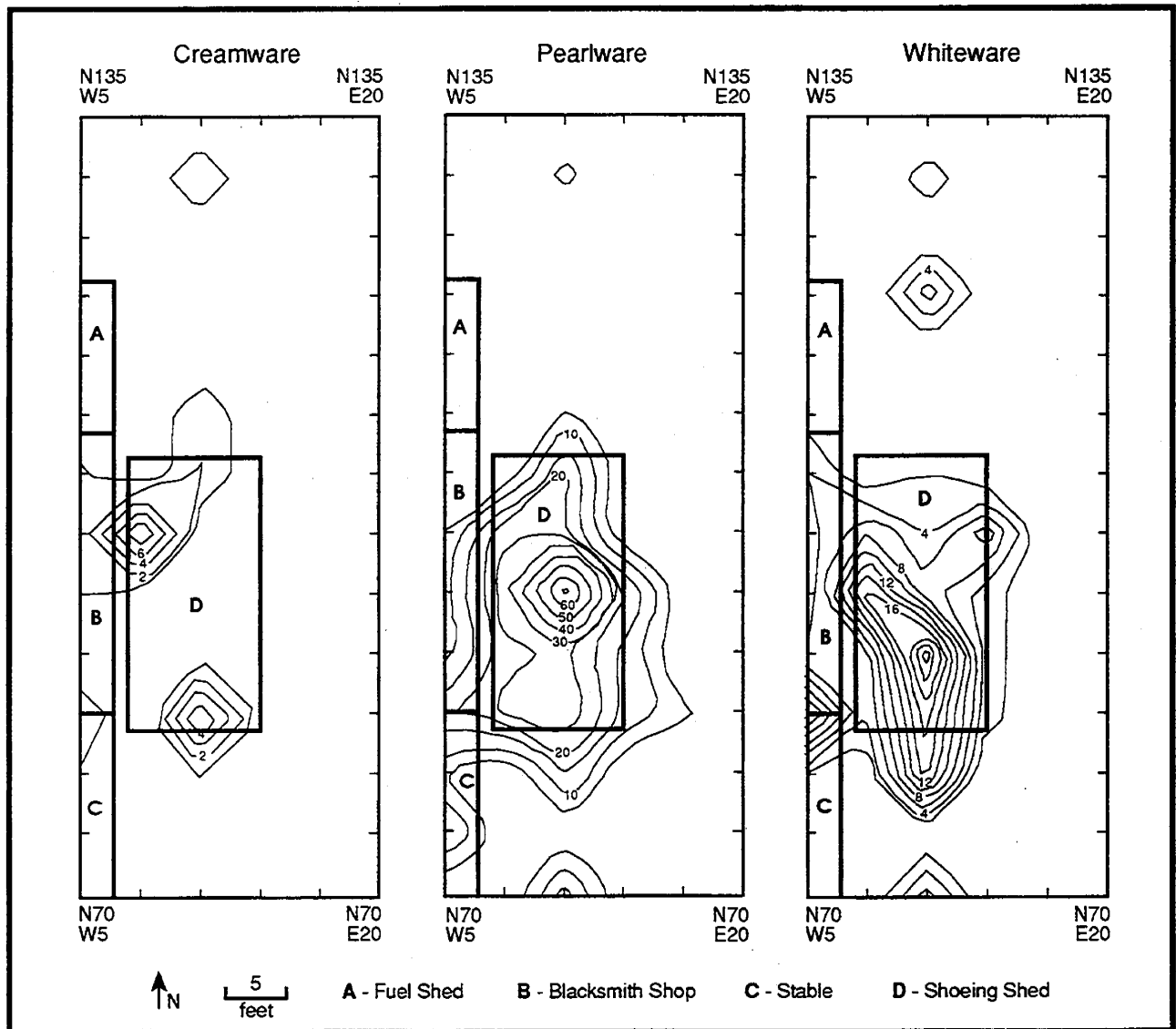
stable. Possibly these densities represent the demolition of these buildings, and the subsequent post-occupational decomposition of the wood.

Calcium: Like the phosphorus levels discussed above, calcium levels were highest in the area around N30E0, and smaller concentrations were identified along the rear wall of the shop and stable, generally diminishing eastwards from the buildings (Figure 31). The high density centered at N30E0 is probably associated with the mortar used in the construction of the stone stable, but could also be a reflection of the manure and other organic refuse inside of the stable. The other relatively high densities of calcium are most likely associated with the mortar used in building the shop and stables.

Magnesium: The distribution of magnesium across the Mermaid Blacksmith Shop Site is somewhat of an anomaly, because it does not match either the calcium or phosphorus distributions (Figure 31). A

FIGURE 26

Distribution of Creamware, Pearlware, and Whiteware Sherds in the Plow Zone

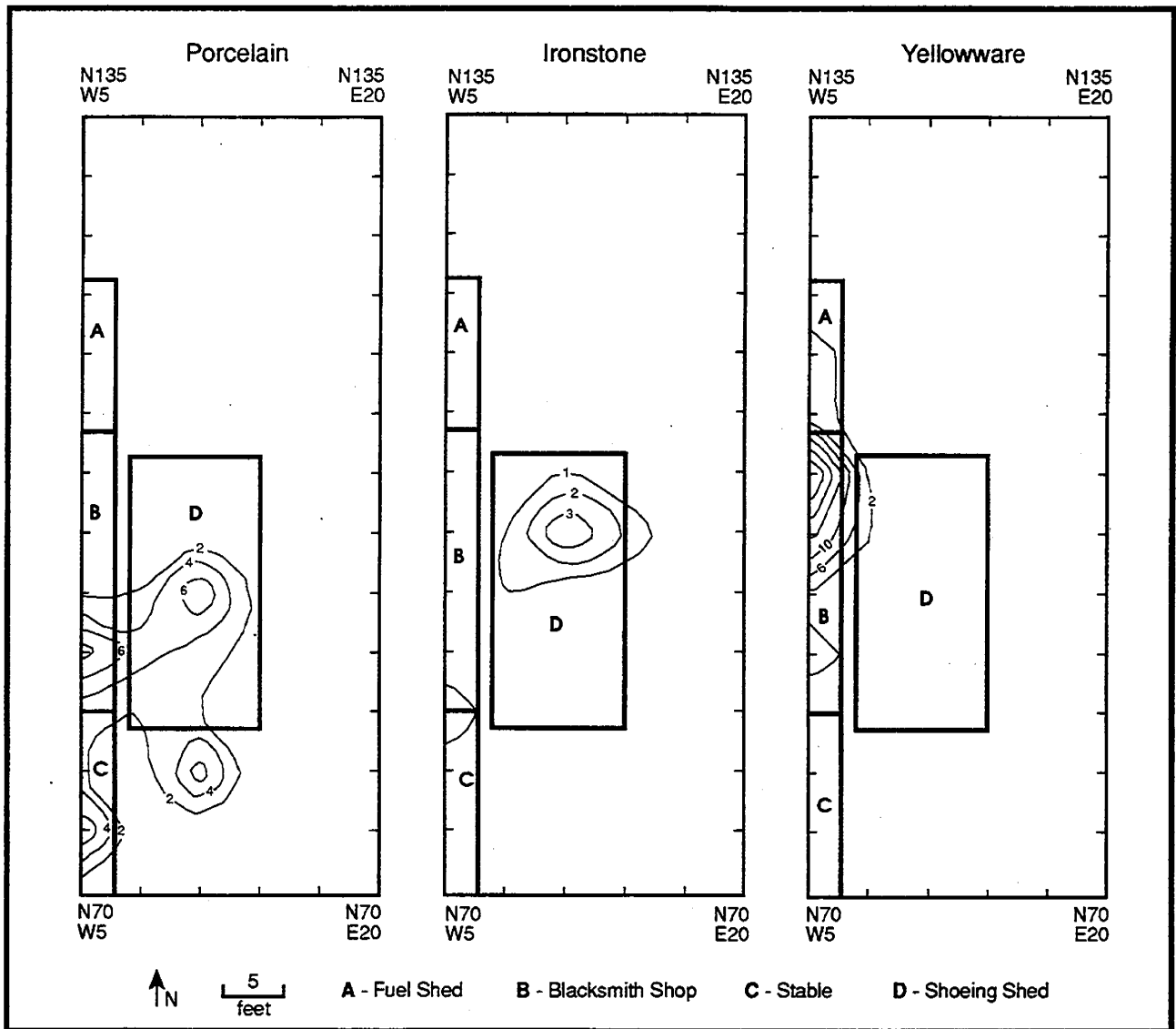


high density of magnesium was located at N65E5, but generally the level of magnesium shows no apparent correlation to the stables or shop.

pH: The soil pH levels at the Blacksmith Shop are generally below 7.0, indicating that the soil is acidic (Figure 31). As with the phosphorus and calcium, pH is highest in the vicinity of N30E0, again supporting the presence of manure and other organics, and mortar related to construction in the soil.

FIGURE 27

Distribution of Porcelain, Ironstone, and Yellowware Sherds in the Plow Zone

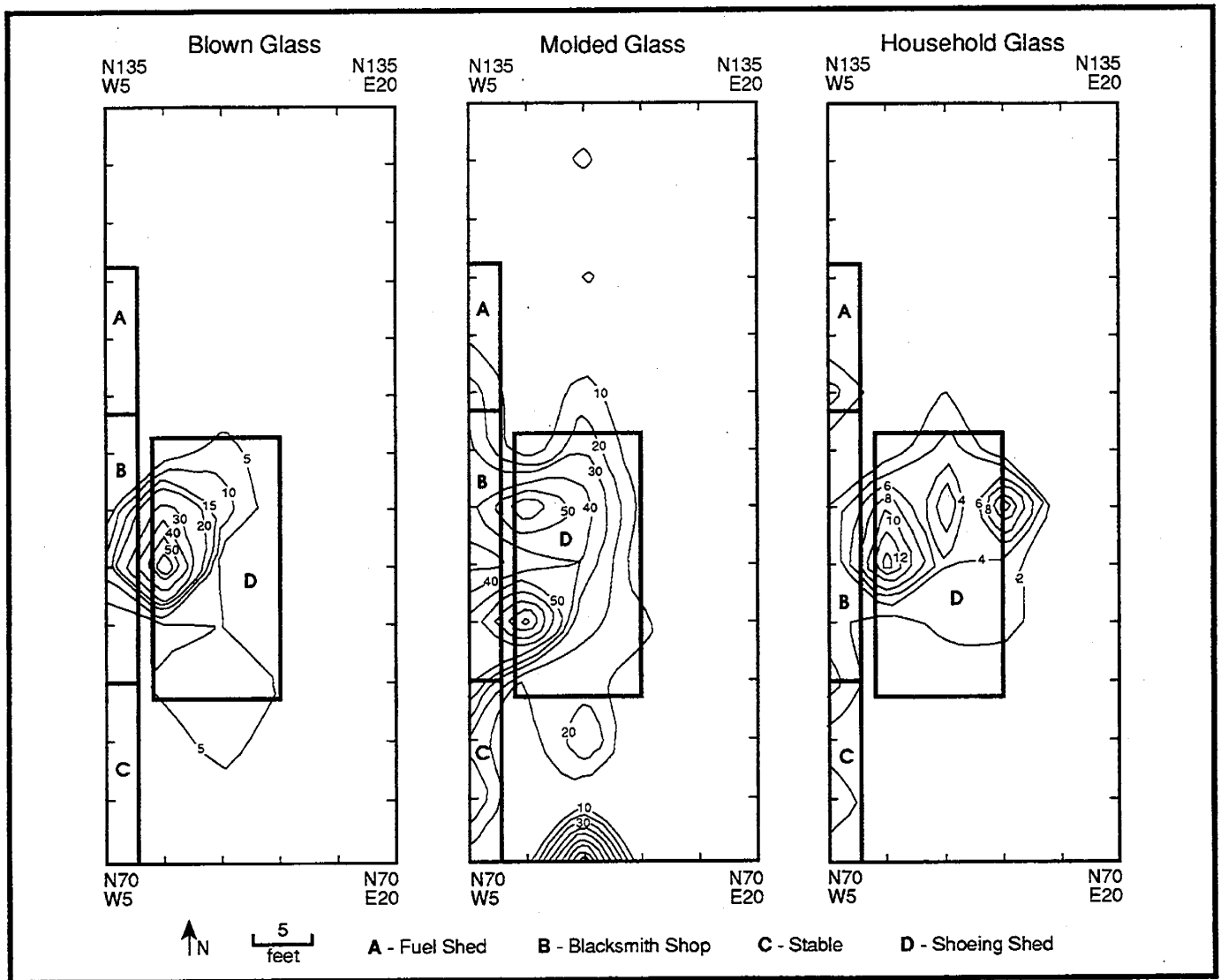


SITE SUMMARY AND INTERPRETATIONS

In her study of nineteenth-century Pennsylvania blacksmiths, Jeanette Lasansky (1980) describes and documents the evolution of the blacksmithing trade. She notes that prior to the 1850s, smiths were fabricators of numerous and varied items, but with the increased availability of manufactured goods, such as nails, horseshoes, and agricultural implements, by the mid-nineteenth century, blacksmiths shifted to repair work and away from the fabrication of new or unique (one-of-a-kind) items. The tasks of rural blacksmiths became more repair oriented, and included edging, altering, piercing, welding,

FIGURE 28

Distribution of Blown Glass, Molded Glass, and Household Glass Sherds in the Plow Zone

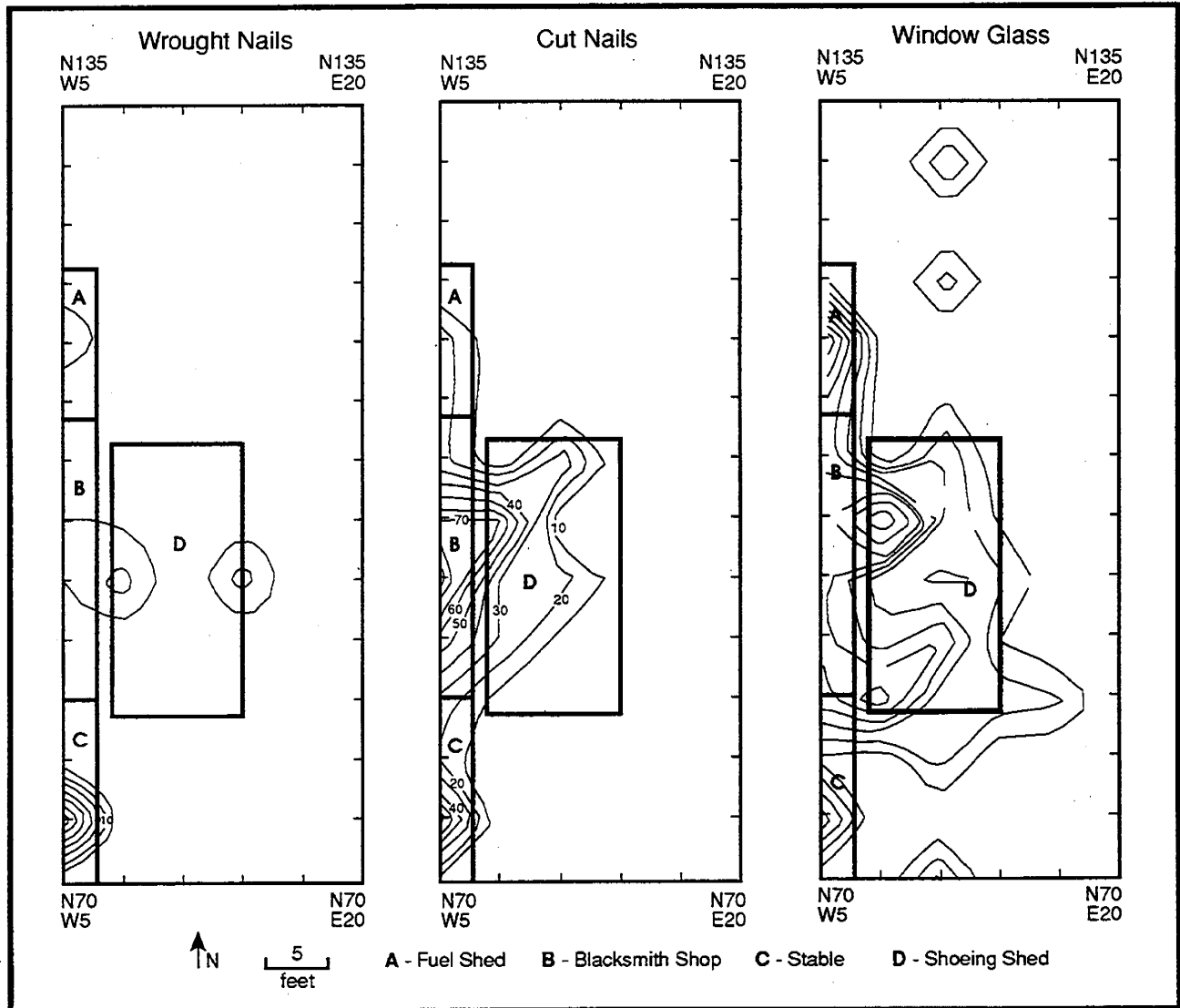


replacing tires, and horse shoeing (Lasansky 1980:17). After the middle of the nineteenth century, blacksmiths continued to manufacture some items, such as tools (especially their own), wagon parts, hardware and household items (Lasansky 1980:26). By the end of the nineteenth century the blacksmith became more of a mechanic than an artisan, as reliance on draft animals diminished and agricultural techniques and practices changed.

The artifacts that were recovered from the Mermaid Blacksmith shop reflect the work and refuse of a mid-to-late nineteenth century blacksmith, probably Milton Steel. Much of the ceramics and

FIGURE 29

Distribution of Wrought Nails, Cut Nails, and Window Glass in the Plow Zone



glass recovered could be associated with the occupation by the Ball family; certainly the shop and a portion of the stables was constructed during their tenure of the site. The construction of the fuel shed may date to about 1830, or approximately the time that Samuel Walker purchased the Mermaid property. The large number of horse tack and carriage furnishings illustrate a strong dependence by the Mermaid smiths on shoeing and agricultural and transportation repair for their livelihoods. A large variety of other artifacts such as wood working tools, handles, and keys indicates other tasks that were carried out at the shop, but there are few "decorative" artifacts in the refuse, suggesting that the Mermaid smiths did mostly utilitarian service.

FIGURE 30
Distribution of Brick, Slag, Scrap Iron, and Coal / Charcoal Sherds in the
Plow Zone

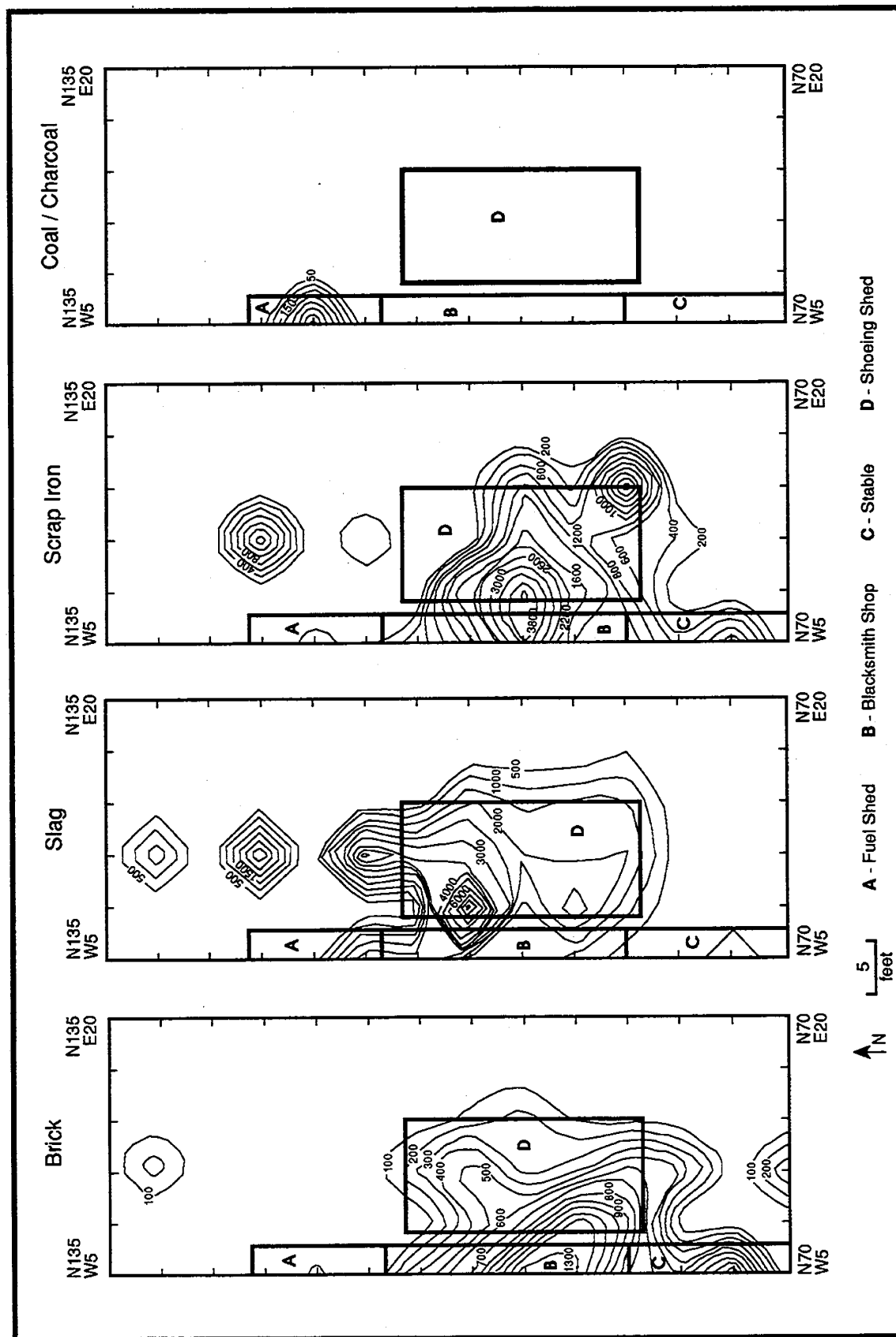
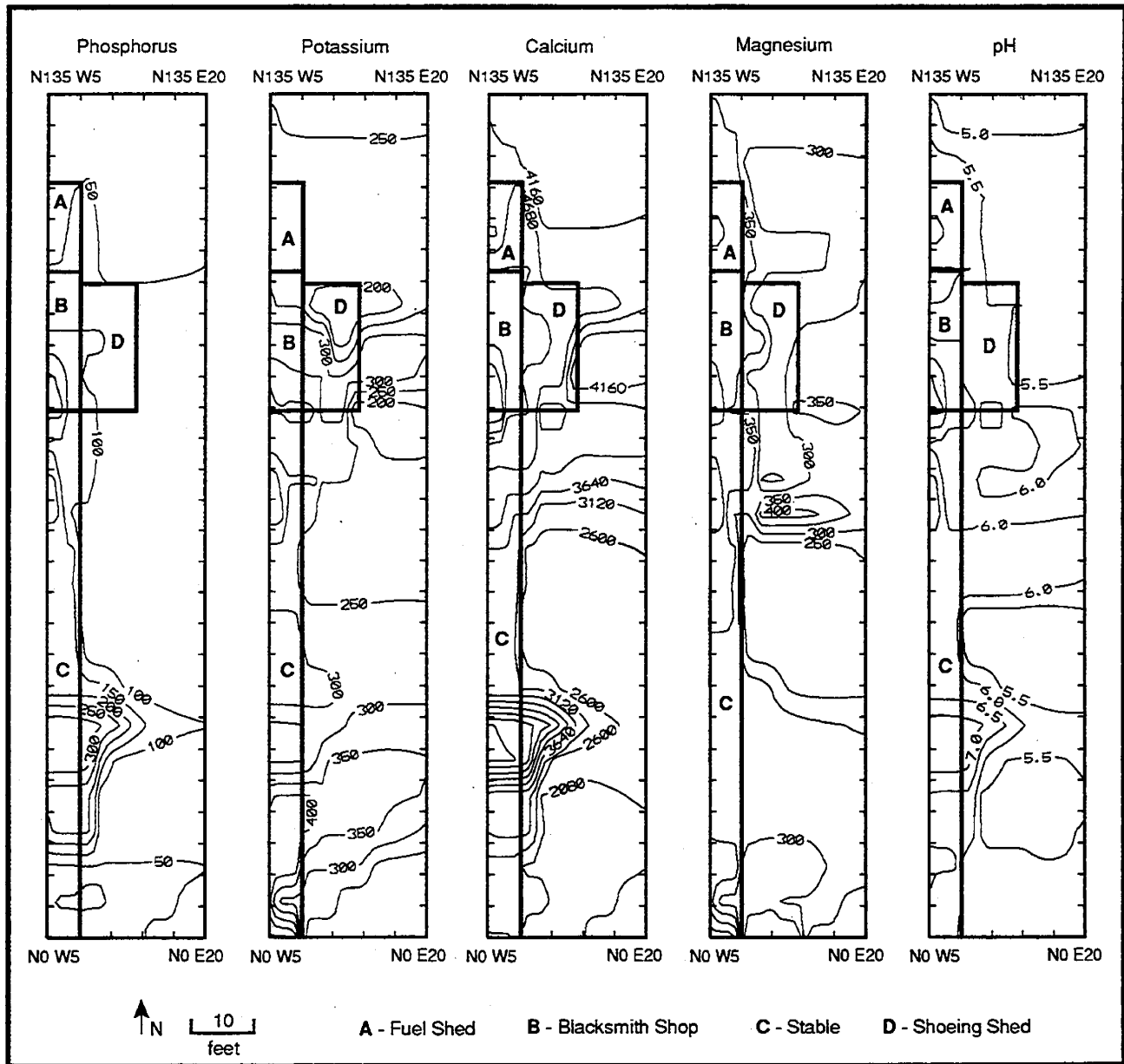


FIGURE 31

Distribution of Phosphorus, Potassium, Calcium, Magnesium, and pH



Based on the archaeological evidence, the horse trade and all that went with it undoubtedly took up most of the Mermaid blacksmiths' time. The robust horse shoes, many heavily worn and some completely worn through at the toe, were indicative of horses pulling heavy loads such as plows and wagons, or possibly wagon teams hauling limestone from the nearby quarries in the Pike Creek Valley (Cooch 1936:41-46). Worn hame clips, the metal loop at the end of harness reins that attach to the hame, and the metal yolk of horse collars, are indicative of draft work (Plate 34). The same can be said

PLATE 34

Worn Hame Clips from Mermaid Blacksmith Shop and Stable Site



of the chain links which are ubiquitous on draft harnesses. A fragment of a large snaffle bit was also recovered; the size of this bit indicates a large horse. Other horse tack includes an iron support bracket for a saddle tree to an English saddle (Plate 35), a smaller snaffle bit for riding, a swivel hook, a small buckle that could belong to a bridle, and a possible hoof pick. The presence of cut off calkins, the metal cleats at the end of the horse shoe, indicate at least occasional use of machine-made horse shoes, artifacts that were being made at least as early as 1835 (Lasansky 1980:13) and were available by 1865 in a variety of catalogs (Nelson 1980:250).

Several archaeological features located on the east side of the shop wall (Feature 11), appear to be directly associated with the process of horse shoeing. Feature 2 and it's associated Features 2A, 2B, 33, and 37 appear to be a stall with a worn depression partially filled with cobbles. Horses commonly wear depressions where they are tethered. A constant effort on the part of the smith or stable hand is

PLATE 35

Iron Support Bracket for English Saddle, Mermaid Blacksmith Shop and Stable Site



required to keep these depressions filled. The second highest count of horse shoe nails in the plow zone above these features tends to support this conclusion. It is also common practice to tie a horse that is to be shod between two posts. Given this, horses proclivity to wear down where they stand, and that the highest occurrence of horse shoe nails directly over Feature 4, this large feature with associated posts, Features 46, 10, and 16, seems to be a major horse shoeing area. Feature 8, 9, and 70 also seem to comprise another shoeing location but out side the shed.

The repair of horse drawn equipment was indicated by the recovery of numerous horse tree end clips, worn shoe bolts, plow tips, a cultivator blade, a spike that could belong to a harrow, two sickle bar mower points, and other heavy iron mounts and plates. The horse tree end clips are iron mounts that cap the end of the cross piece that attaches to the harness. Shoe bolts have heads that taper towards the shank. They are used to hold tire irons and sled runners on their frames. The plow tips, cultivator

blade, sickle bar mower points, and harrow point are evidence of repair of agricultural equipment. Sickle bar mowers, though efficient, are notorious for needing repair. The iron mounts, horse tree clips and shoe bolts indicate wagon, cart, and sled repair. The limestone quarries down the road and adjacent farm land would have provided ample demand for work of this kind.

Other miscellaneous repairs are evidenced by a number of broken rivets, sheet iron patches, the odd nut and bolt, a lump of lead and a lump of zinc, and several crudely made iron rings probably for reinforcing wooden shafts. Alphonsus Moolenschot agreed to examine some of the artifacts that were recovered and noted that the iron work was not well finished or carefully done (Moolenschot, personal communication 1991). Whether these poorly executed scraps were fragments of these particular smiths or whether they were expedient repairs done elsewhere and removed by these blacksmiths could not be determined. The presence of only three copper rivets supports the argument against the execution of harness or leather work, with the exception of replacing worn hame clips and harness chains.

Very little archaeological evidence remained of the other jobs a blacksmith would have carried out, such as sharpening, edging, welding, altering, and piercing. There was some evidence for sharpening and the laying on of new edges. The wood working tools and scissors were probably scraps of tool steel kept for reworking into blade edges. Interestingly enough, the scissors recovered from Test Unit N95W5 were intact except for the finger loops, making them otherwise unusable except as scrap or for reuse. An axe head without a cutting edge is also evidence of the possible curation and reuse of metal objects. Alphonsus Moolenschot noted that as a group blacksmiths were (and still are) notoriously frugal with their resources and save and reuse metals whenever possible (Moolenschot, personal communication 1991). Thus the curation of metals indicated by the Mermaid shop artifacts would not have been out of character for rural blacksmiths.

A more accurate picture of the blacksmithing operation would have emerged if the complete shop had survived instead of just the rear shop wall, the coal shed, and the shoeing shed off the back. The large amount of metal waste in the plow zone and features is not surprising due to the cluttered manner in which most smiths keep their shops (Lasansky 1980; Huff, personal communication 1992). Huff suggests that clutter is common when a smith is busy with varied tasks, but does not happen when

he is set up for mass production or repetitive tasks. The wide range of scrap and tools recovered from the Mermaid Blacksmith shop confirms that horse shoeing, repair work on a wide variety of objects, and replacing tires were the mainstays of the shop's operations during the nineteenth century.

Other archaeological projects at blacksmith shops have been able to examine the remains of the entire shop, thus providing an opportunity to investigate not only the kinds of smithing jobs that were done, but also the layout of the shop (Harrington 1969; Geib and Kurtz 1981; Light 1984; Coleman et al. 1985; Faulkner 1986; Light and Unglik 1987; McBride 1987; Pogue 1989; De Vore 1991). Light (1984:55) defined four areas of a blacksmith shop that could be discerned through archaeological investigations: work space, a general storage area, a "domestic" area, and a refuse area. The investigations at the Mermaid shop were able to define the refuse area, and possibly the work area associated with the horseshoeing shed. Unfortunately little of the shop itself remained at Mermaid, so questions dealing with "public spaces" within the shop, or whether there was any differentiation of space at all, cannot be answered. Therefore, several of the questions posed by the research design, such as shop layout, patterns of work behavior, and the domestic lives of the smiths, were not addressed.

However, questions concerning landscape and structural alterations, production, and site location and use can be addressed. From the archaeological and documentary evidence it appears that the Mermaid shop was a small masonry structure, approximately 26'x 20'. Research by architectural historians in Delaware suggests that the shop itself would have resembled a one-room house on the exterior (Lanier and Herman 1992:57). Attached to the gable ends of the shop were a stone stable (possibly built in two stages) extending to the intersection, and a stone fuel shed added to the north end about 1830. Documentary evidence indicates that there was a second floor to the blacksmith shop, an uncommon occurrence according to Lasansky (1980:6), unless wagon repairs were a standard job. A second floor was present at the Wilson shop in Delaware (Coleman et al. 1985), which combined blacksmithing and wagon repair.

Based on other archaeologically investigated blacksmith shops, the average size of a shop was about 459 square feet (Table 17). The Mermaid shop appears to have been considerably larger than the average shop, and was closer in size to the smithing portions of the Alexander Wilson shop and the Webb shop (Coleman et al. 1985; Harrington 1969). The smallest of the shops, at Fort St. Joseph's,

TABLE 17

Comparison of Dimensions and 1st Floor Square Footage at Several Excavated Blacksmith and Wheelwright Shops

Shop and Location	Dimensions in feet	Square feet	Sources
Wilson Agricultural Works, New Castle County, DE:			
Blacksmith Shop	28 x 20.5	574	Coleman et al. 1985
Wheelwright Shop	22 x 20.5	451	
Mermaid, New Castle County, DE:			
Blacksmith shop	26 x 20 (approximate)	520	
Wheelwright shop	25 x 20 (approximate)	500	
Webb, Nauvoo, IL:			
Blacksmith shop	25 x 20	500	Harrington 1969
Wheelwright shop	36 x 20	720	
Griswold, Barton, MS:			
Blacksmith shop	29.5 x 16.5	487	McBride 1987
Mt. Vernon, Fairfax County, VA:			
Blacksmith shop	24 x 18	432	Pogue 1989
Joanna Furnace, Chester County, Pa:			
Blacksmith shop	16.2 x 24.3	394	Geib and Kurtz 1981
Fort St. Joseph, Ontario:			
Blacksmith shop	19 x 16	304	Light and Unglik 1987

Ontario, was the location of a frontier blacksmith (Light and Unglik 1987). Overall, the size of a shop seems to have been influenced by several factors, including location, access to transportation routes, number of working smiths and apprentices, size of the population serviced, and the types of smithing undertaken.

The importance of several of these factors is obvious in a comparison of the Alexander Wilson Agricultural Works and the Cavender-Fisher-Pierson shop discussed previously. Both shops were located in New Castle County, and both served a rural and local clientele, but here the similarities end. Where the Cavender-Fisher-Pierson shop was only a blacksmith shop, the Wilson works combined smithing with wheelwrighting and a machine shop. The proximity of the Wilson shop to a railroad line provided access for that business to a larger regional market ranging from New York to North Carolina, and Alexander Wilson manufactured plows and other "agricultural implements" for that market. The opportunity to supply machined and forged tools meant that Wilson's business was larger than any other shop complex in rural New Castle County. By 1880 the Wilson Works employed 7 men and produced \$7600 of goods annually, accounting for nearly a quarter of the product of all of the blacksmiths and

wheelwrights working in northern New Castle County (outside of Wilmington). The Wilson Works were second only to the Marshall Brothers Sheet Iron Company that produced \$75,000 of goods annually (Coleman et al. 1985). In contrast, by 1880 the locally-oriented Cavender-Fisher-Pierson shop employed only 2 men and annually produced goods valued at \$500. Even a decade earlier, at the height of the shop's business, the Cavender-Fisher-Pierson shop annually produced goods valued at \$1200, considerably less than the \$5000 produced by Wilson in 1870 (Coleman et al. 1985:131-132).

Compared to these businesses, the Mermaid blacksmith shop clearly functioned on a much smaller scale, serving the customers of the Mermaid Hotel and possibly the teamsters at the nearby Eastburn limestone quarries. The significance of the structure was probably associated more with the sense of community or "village space" that it provided, rather than in the importance of what was produced at the shop. The state directories during the second half of the nineteenth-century list about one hundred people that called Mermaid their post office, a clear indication of the size of this rural community. Besides the shops, stables, barn, and tavern (that housed the post office) at the intersection, the "village" of Mermaid may have included the shoe shop of Bernard Glatz, and the homes and work places of masons, clockmakers, a doctor, and a weaver, all located between the Mermaid intersection and the Harmony Schoolhouse at Curtis Mill Road (Catts and Bachman 1987). By the middle of the nineteenth-century Mermaid would have had the appearance of an open rural community, with the shops, barn, tavern, and outbuildings at the intersection forming the core of the village but, with a much less well defined outer boundary of agricultural properties (Figure 32). Analysis of the business records and area of service at the Alexander Wilson Agricultural Works by Coleman et al. (1985:140-143) revealed an approximate 4.5-mile radius comprised the surrounding "community" for the shops, using Murdock's (1949) definition of community as "the maximal group of persons who normally reside together in face-to-face association." Applying the 4.5-mile radius to the Mermaid Blacksmith Shop provides a rough approximation of the maximum extent of the Mermaid community, and would have included all of Mill Creek Hundred and much of neighboring White Clay Creek and Christiana hundreds, as well as parts of Chester County, Pennsylvania.

FIGURE 32

Mermaid Blacksmith Shop Reconstruction, circa 1850

